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THE MARINE CORPS FLYING HOUR PROGRAM

by

Norbert Michael Murray III

June, 1986

Thesis Advisors: Jerry L. McCaffery
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The basic conclusion from this study is the current program is underfunded because it incorrectly stated. The efficiency of the program can be improved to increase the fectiveness of the program. Of the alternatives presented some are relatively minor and uld provide some improvement to the current system, while others are far more radical d would result in major modifications.

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The Marine Corps Flying Hour Program

by

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Lieutenant Colonel, United States Marine Corps
B.A., University of California, 1979

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June, 1986

ABSTRACT

The objective of this thesis is to examine the structure and process of budget formulation and execution of the USMC tactical air flying hour program. It looks at how flight hour requirements are translated to budget requests, how the allocated funds are managed, and examines methods of evaluating the effectiveness of the program. Data and information was collected by field visits and interviews with program managers, funds administrators, SecNav analysts, representatives of the Fiscal Division and Aviation branchs at Headquarters Marine Corps, and fleet operations and fiscal managers.

The basic conclusion from this study is the current program is underfunded because it is incorrectly stated. The efficiency of the program can be improved to increase the effectiveness of the program. Of the alternatives presented some are relatively minor and could provide some improvement to the current system, while others are far more radical and would result in major modifications.

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I. INTRODUCTION

A. BACKGROUND

Marine Corps aviation plays an integral role in our nation's defense. The nation has made a sizeable investment to provide the Marine Corps with high quality, affordable, state of the art aircraft. Congress provides the resources to support the program and the Marines are expected to manage those resources through sound fiscal and operational responsibility so as to get the maximum return on the investment. This thesis looks at the program established to plan for and manage the funds that support the day-to-day operations of Marine Aviation. The cost, effectineness, and efficiency of the program are examined to determine what, if any, changes can be made to maximize the return on the nation's investment.

Providing and managing the resources required to support Marine Corps aviation operations is challenging and frustrating as the process is complex, difficult to measure, highly competitive, and difficult to understand. A general description of the program, appropriately called the Flying Hour Program (FHP), will provide the background for discussion of the complexities and related problems.

Marine Aviation is the extension of Naval Air Forces ashore, providing support to amphibious surface and ground

forces. As a part of Naval Aviation, all funding for procurement and operations of Marine Corps aircraft is provided by the Navy. The Flying Hour Program is a Department of the Navy program to manage the budget line items that go into flight operations. These line items, or Operating Target (OPTAR) Functional Categories (OFC's), are part of the Operations and Maintenance, Navy (O&M,N) Appropriation that provide the day to day operating funds for the General Purpose Forces* of the Navy - including Marine Corps Aviation assets. The funds are used for fuel, oil and lubricants, flight equipment, maintenance, and spare parts.

The method used to define both the Navy and Marine flying hour requirements is based in the computation of the number of flying hours required to support what is called Primary Mission Readiness (PMR) for any particular type aircraft and a fixed ratio of crews per aircraft or Crew Seat Ratio (CSR). However, the PMR relates only to TACAIR/ASW aircraft since other types of aircraft need to be

---

* U.S. naval forces are divided into two categories by basic general capabilities. They are the Strategic Forces made up of fleet ballistic missile submarines and the General Purpose Forces which includes all other forces. Navy/Marine aviation falls under General Purpose Forces and is further divided into three groups: (1) Tactical Air/Antisubmarine Squadrons (TACAIR/ASW); (2) Fleet Readiness Squadrons (FRS); and (3) Fleet Support Squadrons. The TACAIR/ASW Squadrons are combat squadrons and are those that can be deployed aboard ship and to forward deployment bases. Marine Corps TACAIR squadrons are organizationally assigned to Marine Air Groups (MAG's).[Ref. 1]

funded at 100% and operate on relatively fixed numbers of flying hours.

Being a part of the Department of the Navy (DON) structure creates both simplifications and complexities for the Marine Corps program managers. Fiscal responsibility and administration for the O&M,N appropriation above the Fleet Marine Force level is entirely the Navy's. Marine commanders do not have legal or accounting responsibility as set forth by U.S. Codes 1301 and 1517** for the assigned "Blue Dollars" as the O&M,N funds are called. Above the Fleet Marine Force level there is minimal Marine Corps representation.

These very simplifications actually create other problems. Until mid-1985 there was no Marine Corps representation in the budget process that could speak for or defend Marine Corps interests in the "Blue Dollar" account. Because of differences in Navy and Marine Corps reporting procedures there is an equivalent increase in the paperwork in the Fleet commands to maintain two different systems - the "Blue Dollar" accounts and the Marine Corps "Green Dollar" accounts. Because they are not Operating Budget(OPBUD) holders for "Blue Dollars", Force Commanders do not have the same authority and flexibility as they do with the Operations and Maintenance, Marine Corps(O&M,MC) or

** Formerly Section 3678, Revised Statutes(R.S.), 31 U.S. Code 628, and Section 3679, R.S., 31 U.S. Code 665.

"Green Dollars" allotment. This also creates a separate and additional chain of command with which a Force Commander must contend.

Until the early 1980's the Marine Corps was unable to execute the budgeted program for various reasons. As a result there was always more than enough hours available and the Flying Hour Program was not very active. The Navy normally ended up flying the hours the Marines could not use. During 1981-1982 most of the deficiencies were eliminated or reduced, and the excess funding began to dwindle to the point that there needed to be better planning and management of resources. With the onset of a tight Flying Hour Program a new problem arose - that of the cost per flight hour. The planning documents did not accurately reflect the real cost per hour. Commanders had also been realigning large numbers of flight hours among the various type/model/series (TMS) aircraft which had resulted in an imbalance between flying hours and the necessary material support. Up to this point the Marines had been basically managing the bottom line, but with attention now focused on cost per hour they were forced into management by TMS. As a result the FY 1983 program was plagued by pricing problems in fuel consumption and maintenance costs which forced reductions in flying hours in order to finance higher costs.

As the managers of the program became more experienced and proficient and the program was more finely tuned new

problems and complexities surfaced. Some have been resolved, some will eventually be worked out or reduced, and others will always exist. The underlying difficulty is being able to correctly identify, define, state, and sell the flying hour requirements for Marine TACAIR.

B. OBJECTIVES

The basic objective of this thesis is to examine and evaluate the planning, funding, and execution of those elements that provide the direct support of th U.S. Marine Corps' flight hour program, and to determine where changes or improvements can be made to increase the effectiveness of the Flying Hour Program. This is approached through the isolation and discussion of current problems within, and externalities that influence the system and provide alternatives that might make the program more effective.

During the formulation stage of this study the original idea was to examine the feasibility of making the Marine Corps flight hour program independent of the Navy program, and make the program part of the O&M,MC allocation. This solution is an oversimplification of the problem and although it would eliminate or lessen many of the problems it is impractical and would never occur. Therefore the scope of the study was expanded to look at a number of smaller alternatives to problems within the current system. Some are relatively minor and would merely require expansion

or changes in current procedures while others are somewhat more ambitious and would create more impact on the system.

A basic and critical question is what are the goals of the flight hour program and does the current system provide the resources required to those objectives? The study compares the objectives to the criteria used to state the requirements of the program and discusses the compatibility of the program with the objectives. The current requirements are understated or incorrectly stated and therefore do not correctly establish the needs of the program, subsequently the program ends up being underfunded and the goals of the operating forces are not met. This is probably the major shortcoming of the program today. The study looks at these areas and examines what the impact to combat readiness may be.

Problems within the administration of the program that impact on overall efficiency are examined with the idea of improving the administration of the program to make it more efficient. Two areas in particular are the funds flow and training of accounting personnel at the Group level.

There has been criticism from Congress and high level analysts that the Marine Corps does not utilize simulators enough in place of expensive flight hours. The greater use of simulators to replace actual flight hours is looked at as an alternative to increase readiness without a equivalent increase in the allocation.

Although not one of the main objectives, the question of the evaluation system used to measure readiness is considered along with the other questions. Readiness is the ultimate goal of the program and how that readiness is measured to provide feedback to the system is important. The question is raised as to whether the current measurement system is a realistic gauge of the ability of TACAIR squadrons to go to war. Because those measurements are used in the budgetary process as justification they have an impact on allocations, especially if the credibility of the system is challenged.

As the research on this thesis progressed it became apparent that although there is a great deal of information regarding the Flying Hour Program, there is no one source or comprehensive material available. The majority of the background and historical material is in the heads of the individuals that have been involved in the evolution to the program. This thesis has been expanded somewhat in the background areas so as to provide a source about the background of the Marine Corps Flying Hour Program.

C. THE RESEARCH QUESTION

Is the Marine Corps Flying Hour Program as effective as it can be with a given cost? If not, how can it be made more effective? By improving the efficiency of the budgeting and/or execution so that the taxpayer gets more

for his money? By increasing the cost of the program - making more money available to execute the program? Is the measurement system used to determine effectiveness adequate? Do we know what we are paying for?

These are rather complex questions and because of the rather subjective, and in some cases - political, nature of the study clear and definitive conlusions are difficult to establish.

D. SCOPE

The theme of this study is the Marine Corps Flying Hour Program. The FHP is concerned with the day-to-day operational costs to fly an aircraft and the dollar and hour totals required to meet the readiness objectives of the Marine Corps. The operational costs, funded as part of the O&M,N allocation, are made up of fuel, flight equipment, maintenance, and depot level repairables (DLR). The study is limited to the costs of tactical air (TACAIR) which account for 77% of the dollars in the program. The other requirements funded in the program are a relatively fixed number of flight hours for undergraduate and fleet readiness squadrons (FRS) training pipelines. These hours are based upon a fixed number of syllabus hours and student loads. The remaining hours are the result of tasking by higher authorities for strategic and fleet support aircraft. The

reserve force flight hour program will not be considered as it is funded as part of the O&M,NR appropriation.

The flying hour program is changing and dynamic. When the study was initially undertaken one of the major weaknesses of the program was that there was no Marine Corps representation at the Department of the Navy or OSD levels. Since that time representatives from the Office of the DCS for Aviation and Fiscal division at Headquarters Marine Corps have been assigned to monitor the "Blue Dollars" or flight hour money in the O&M,N allocation. There are other areas that may be discussed that are no longer factors in the program or may be resolved in the near future. The affects of the Gramm-Rudman-Hollings bill will not be considered.

The Fleet Marine Force Pacific (FMFPAC) gets the majority of the attention in the study. FMFPAC has the greater number of assets with two aircraft wings and the 1stMARBDE. FMFPAC has over 40% more aircraft than FMFLANT and had a $76M greater budget in FY85. A research trip was made to FMFPAC Headquarters and the majority of the data and input to the study came from FMFPAC sources. Because of the time and distance separation from San Diego (headquarters of Naval Air Forces, Pacific) and Washington, D.C., FMFPAC seems to be somewhat more sensitive to some of the problems within the program, and therefore a better subject to focus on for the study.

The bias of this thesis is towards the Marine Corps. The majority of the inputs were from Marine Corps sources and seen from that perspective. Due to limitations in time and travel not everyone with an interest in the program could be interviewed, especially at the higher Navy levels.

E. METHODOLOGY

The primary source of data and information for this thesis was through interviews. There is little available in the literature that provides specific information on the Marine Corps Flying Hour Program. As the program is very dynamic the most current information had an affect on the study. Some problems that existed in May 1985 did not exist six months later. The idea of examining the Marine FHP was proposed by FMFPAC because of concerns over the funds flow and control of FMF aviation operating resources. A research trip to FMFPAC Headquarters at Camp Smith, Hawaii provided the introduction to the Marine Corps FHP and the background for this study.

The next trip was to Washington, D.C. and an opportunity to interview several of the key figures in the program. Mr. Greg Barber, NAVCOMPT analyst, and LtCol R.K. Ward, OP-501(acquisition and budget), provided substantial insight and information. This trip also provided the opportunity to visit OP-51, the Flying Hour Program Coordinator, where the Operations Plan (OP-20) is developed,

and to visit the Aviation Plans and Policy (APP) branch at Headquarters, Marine Corps.

A research trip to Southern California was made to visit the Comptroller at AirPac, the 3rd Marine Aircraft Wing and Marine Aircraft Group 16 at MCAS(H) Tustin. This particular trip was particularly insightful as it presented views as seen by the operators in the field at the group and squadron level.

In October, 1985 a Flying Hour Conference was sponsored by the Deputy Chief of Staff for Aviation in Washington, D.C.. Principal participants in the Marine FHP attended to discuss problems affecting the program. This conference provided invaluable information to the study. It also provided the opportunity to update previous interviews and interview others from commands that would have been impractical to visit.

Studies, talking papers, directives, data files, messages, and planning documents were made available all along the way and this provided the bulk of the literature type information.

From all the information that was collected a common thread was looked for and a compilation made from the many different ideas and opinions. It became apparent that in some instances what may have been a problem to one command may not have been a problem to another. Because of this a

discussion of a problem may be a little colored towards the individual that expressed concern over it.

F. SUMMARY OF FINDINGS

The Marine Corps Flying Hour Program is underfunded and understated. Considering the present attitude of the Congress and nation in general towards spending and deficits, increasing the funding would not be a probable solution. There would most likely have to be a change in priorities and some other program sacrificed in the interest of an O&M program. There is, however, sufficient justification to attempt an increase in funding requests. There are also areas that can be made more efficient so the return on a finite cost can be raised.

Because the Marine Corps was unable to execute the budgeted program for so long when they were finally able to do so the requirements were found to be incorrectly stated and underfunded. Bureaucracy is slow and resistant to change so the Marine Corps has had a hard time getting the requirements correctly stated. The Navy and Marine corps differ in some areas of operations and administration procedures and stating two different requirements with one plan can lead to misunderstanding and cuts that affect readiness.

The current method of stating requirements by Primary Mission Readiness (PMR) is not adequate for either the Navy

or the Marine Corps programs. Although there are several alternatives to utilize a criteria that better states the requirements the wheels of change have been slow.

Although the FMF commanders perform many of the tasks and have nearly all the expertise on O&M,N funded FMF aviation, they do not have any authority or responsibility for the funds. The FMF commander is merely a conduit of funds from the OPBUD holder at CNAP/CNAL (Commander Naval Air Forces, Pacific/Atlantic) to the OPTAR holders. Changing the funds flow so that they follow the operational chain of command from the Fleet Commanders in Chief directly to the FMF Commanders might improve the capability of the FMF's to execute their budget.

Although the Marine Corps has been criticized for not using flight simulators more there is justification in TACAIR for not using them more.

There seems to be a drop off in understanding the Marine FHP at the extreme ends of the system. At the upper end (Congress, OSD, and NAVCOMPT) there is a difficulty in understanding the requirements from an operators point of view, especially as the Marine FHP is buried in the larger Navy program. At the lower end (groups and squadrons) the operators have a hard time understanding the fiscal side of the program. They see readiness, deployments, operations, and flight hour goals and don't appreciate the dollars and control systems that can affect those objectives.

One weak link in the management of the program occurs in the accounting at the Group level. The individual program may be only as strong as the Group fiscal officer. Marines assigned have training in aviation supply and may not be familiar with Blue Dollar management. There may be as many different systems as there are MAG's. Additionally, they are reporting to two different systems; up the Marine chain for Green Dollars, and to both the Navy responsible center and the Marine chain for Blue Dollars. This makes excessive paperwork. If the FMF commanders were OPBUD holders the reporting system could be simplified and tied in more with the Green Dollar reporting thus giving the Group through FMF fiscal managers better control of the program.

Blue Dollar accounting should be added to current formal training programs for entry level supply clerks and officers. At present neither officer or enlisted financial accounting personnel receive training in O&M,N accounting and must be trained on the job. This substantially delays the time a new clerk or supervisor can become effective and degrades the productive output of personnel who must serve as instructors.

G. ORGANIZATION OF STUDY

This study is divided into six chapters.

Chapter one provides an introduction to the organizational structure and brief background of the study.

Chapter two provides a more detailed background of the program. Included is a detailed description of the structure of the Flying Hour Program, a description of the objectives of Marine Corps aviation, and a history of the program.

Chapter three discusses cost versus effectiveness and looks at the measurement system used to determine the return on the tax dollars.

Chapter four describes and analyzes the problems with the program. It looks at three general areas; stating the flying hour requirement, program managemant, and the understanding of the program at the different levels of the system.

Chapter five provides alternatives to the problems discussed in chapter four.

Chapter six presents conclusions drawn from the study and considers whether the return on the investment can be improved through various alternatives. These alternatives include increasing the investment, leaving the investment alone and improving the quality of the return, or by leaving it alone. It may be possible that the return just cannot be measured in terms of dollars invested and whatever alternative is selected cannot be evaluated.

II. BACKGROUND

This chapter provides the details and structure of the Flying Hour Program to establish the background for the evaluation of the research question. In this chapter the following will be discussed:

* A general description of the Navy/Marine Corps Flying Hour Program to include what it attempts to accomplish, and how it works, is funded, and is managed.
* The objectives of Marine Aviation.
* The history of the Marine Corps Flying Hour Program and where it is today.

A. THE FLYING HOUR PROGRAM

1. Department of Defense

The Department of Defense does not have a single, autonomous flying hour program. It is a compilation of three military departments' separate flying activities. The operation and administration of flying hour programs are service unique and affect a number of separate budget line items. An integral part of each program is training and maintaining proficient aviators. Pilot proficiency in each service is, generally, a measure of combat readiness. However, what functions a "combat ready" pilot must perform will vary between the services.

The Air Force FHP is an aggregate of the programs developed by the three major operating commands; Tactical Air Force (TAF), Strategic Air Command (SAC), and Military Airlift Command. The funds requested to finance the Air Force program is based on factors of aviation fuel, supply requirements and depot level maintenance. MAC is somewhat unique as the principal means of financing operations is through the Airlift Service Fund. The fund is reimbursed by airlift users and in effect the program is self-sufficient. In FY85 the projected FHP budget had been $9.67 billion.

The Air Force uses several methods to rate pilot proficiency depending on the major command to which a pilot is assigned.

The Army FHP is an assimilation of separate programs developed by the Army's major commands (MACOMS). The only restraint is to fly within the total authorized flying hours. Flight time can be shifted between aircraft types. During austere periods expensive aircraft lose flying time in favor of the cheaper to fly models. This freedom to freely switch funds as needed enabled the MACOMS to fly out the programs within budgetary limitations.

The major components of cost are considered to be fuel and consumable supplies, depot level maintenance and aircraft spare parts. For FY 1985 the projected costs of fuel, consumables, and spare parts was $820.6 million.

The Army measures basic flying ability through flight time minimums and task iteration. Pilots are rated on task completion and evaluation in accordance with an Aviator Readiness Level (ARL), the highest level being ARL-1. Pilots who receive only enough time to achieve ARL-1 are not necessarily combat proficient. In order to maintain combat proficient aviators the Army programs flying hours beyond those demanded in the ARL system. `Mission training' is conducted through combat scenarios with ground units. This training is largely the responsibility of the low level commander and is subject only to subjective assessment. Combat proficiency is not quantifiable due to the absence of a requirements based measurement system.

2. Department of the Navy

The Navy and Marine Corps estimate the required flying time per month necessary to be mission ready for each type, model, and series (TMS) of tactical aircraft in use. Historically, the Navy has programmed at approximately 86% of this estimated requirement and resourced the squadrons accordingly.

In the 1960's, Flying Hour Program requirements were tied to the NAVFORSTAT readiness system. Mission areas directly related to the warfare specialty of the aircraft were called fundamental mission requirements and those not directly related were designated supporting mission

requirements. The sum of these two categories was referred to as full mission readiness.

As a consequence of the austere post-Vietnam budgets, the funding for full mission readiness could not be sustained. Navy planners decided that acceptable levels of readiness could be maintained if funding for supporting missions was dropped and flying hours were concentrated exclusively in fundamental, or primary, mission areas, called Primary Mission Readiness (PMR). In reality standards were lowered and PMR became the measure of the requirements.

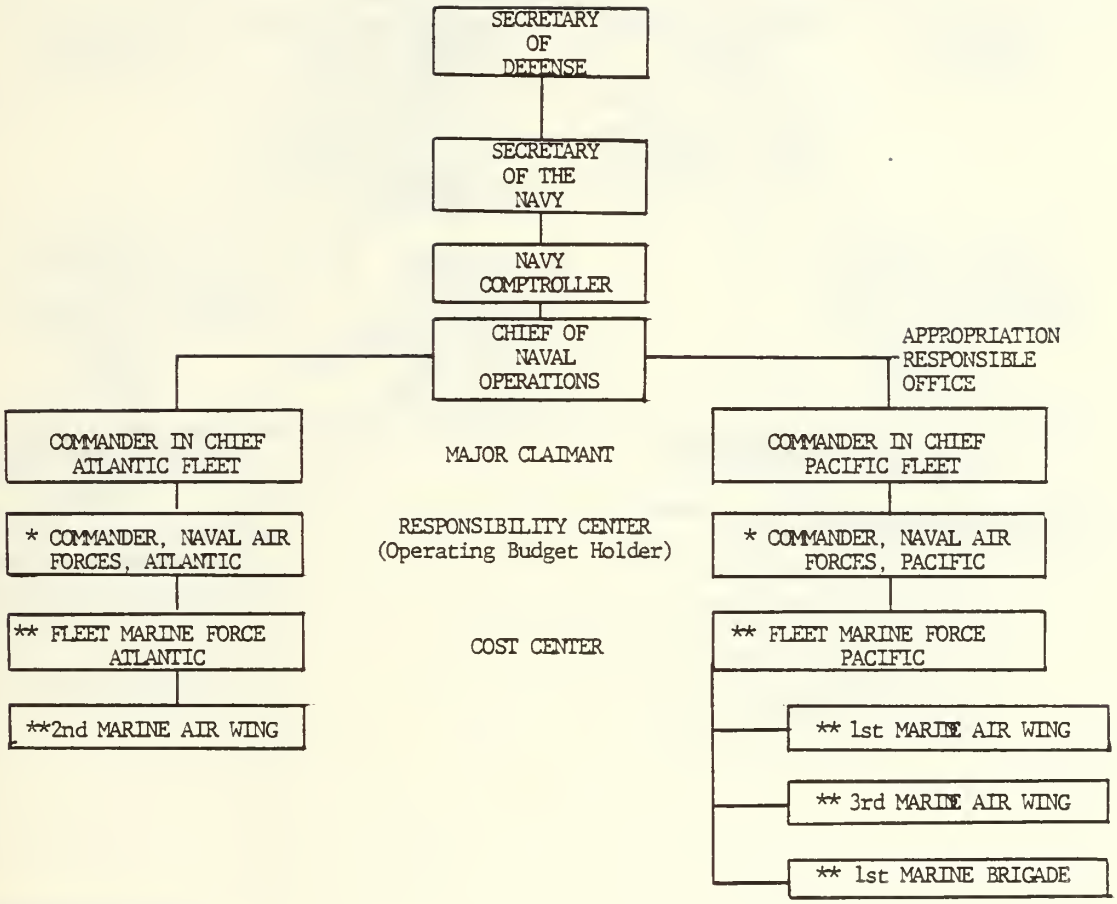
In the mid 1970's budget constraints again dictated flying hour reductions. Although Navy and Marine Corps requirements did not decrease, an internal constraint was imposed which established 88% of PMR as the CNO flying hour goal. 88% PMR is the Department of the Navy's peacetime goal for the overall program, which includes FRS and Fleet Support. In POM 86, the FY87 PMR was funded at 86% (including 2% simulators), however the PMR was raised to 87% during the NAVCOMPT review. The TACAIR percentage is slightly lower than the overall program, with the exception of deployed squadrons which are funded at 115%. For FY87 the flying hour goal for TACAIR is 85% of PMR for both the Navy and the Marine Corps.

The Operations and Maintenance, Navy appropriation provides the funds for the day-to-day operations of the

strategic and general forces of the Navy. Marine Corps aviation receives it's operating funds from the same appropriation. For FY86 the total O&M,N authorization was $25,072.5 million. The total OP-20 Navy/Marine Flying Hour Program is $3,237.287 million, and the Marine TACAIR portion is $545.463 million - a little over 2% of the total O&M,N authorization. In FY87 Navy/Marine TACAIR/ASW accounts for 61% of the total flying hour dollars and 47% of the total hours. Appendix A provides more extensive tables of figures that pertain to the Flying Hour Program.

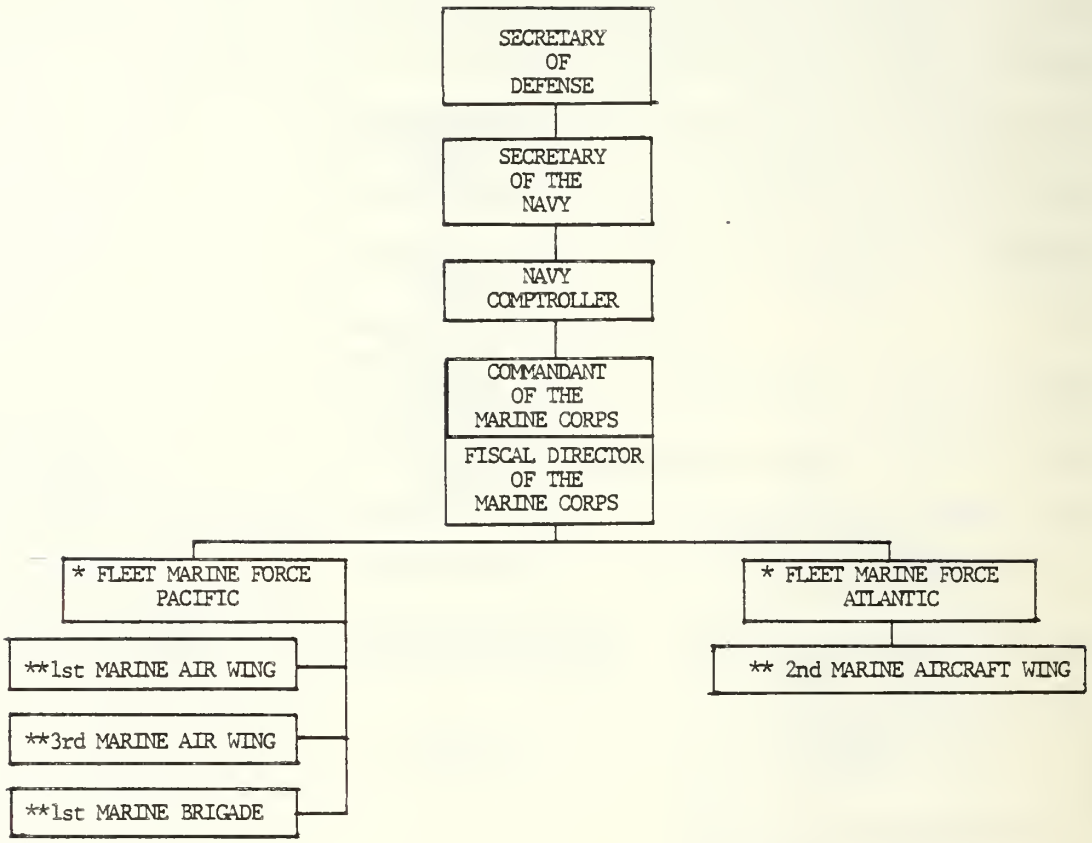
The Flying Hour Program is a Department of the Navy (DON) program that is concerned with the planning and management of the annual flying hours of the Naval and Marine Air Forces. The administrative chain (Figure 2-1) for the flying hours fund flow, budget submission and program management is different than the O&M,MC chain (Figure 2-2) or the operational chain (Figure 2-3) of command. The key difference to the operating squadrons is that the responsibility centers are the Commanders, Naval Air Forces, Atlantic or Pacific (CNAL/CNAP) for the blue dollars and the Commanding Generals, Fleet Marine Forces, Atlantic or Pacific for the green dollars. In the operational chain, the FMF commander reports to CinCLant or CinCPac.

The basis for arriving at the total annual flying hours is the cost per hour (CPH) to fly an individual


SECRETARY OF DEFENSE
SECRETARY OF THE NAVY
NAVY COMPTROLLER
CHIEF OF NAVAL OPERATIONS
APPROPRIATION RESPONSIBLE OFFICE
COMMANDER IN CHIEF ATLANTIC FLEET
MAJOR CLAIMANT
COMMANDER IN CHIEF PACIFIC FLEET
* COMMANDER, NAVAL AIR FORCES, ATLANTIC
RESPONSIBILITY CENTER (Operating Budget Holder)
* COMMANDER, NAVAL AIR FORCES, PACIFIC
** FLEET MARINE FORCE ATLANTIC
COST CENTER
** FLEET MARINE FORCE PACIFIC
**2nd MARINE AIR WING
** 1st MARINE AIR WING
** 3rd MARINE AIR WING
** 1st MARINE BRIGADE

* OPERATING BUDGET HOLDER
** OPERATING TARGET HOLDER

FIGURE 2-1. Organization for funds flow and budget submission for the Operations and Maintenance, Navy Appropriation


SECRETARY OF DEFENSE
SECRETARY OF THE NAVY
NAVY COMPTROLLER
COMMANDANT OF THE MARINE CORPS
FISCAL DIRECTOR OF THE MARINE CORPS
* FLEET MARINE FORCE PACIFIC
**1st MARINE AIR WING
**3rd MARINE AIR WING
**1st MARINE BRIGADE
* FLEET MARINE FORCE ATLANTIC
** 2nd MARINE AIRCRAFT WING

* OPERATING BUDGET HOLDER

** PLANNING ESTIMATE HOLDER

FIGURE 2-2. Organization for funds flow and budget submission for the Operations and Maintenance, Marine Corps Appropriation

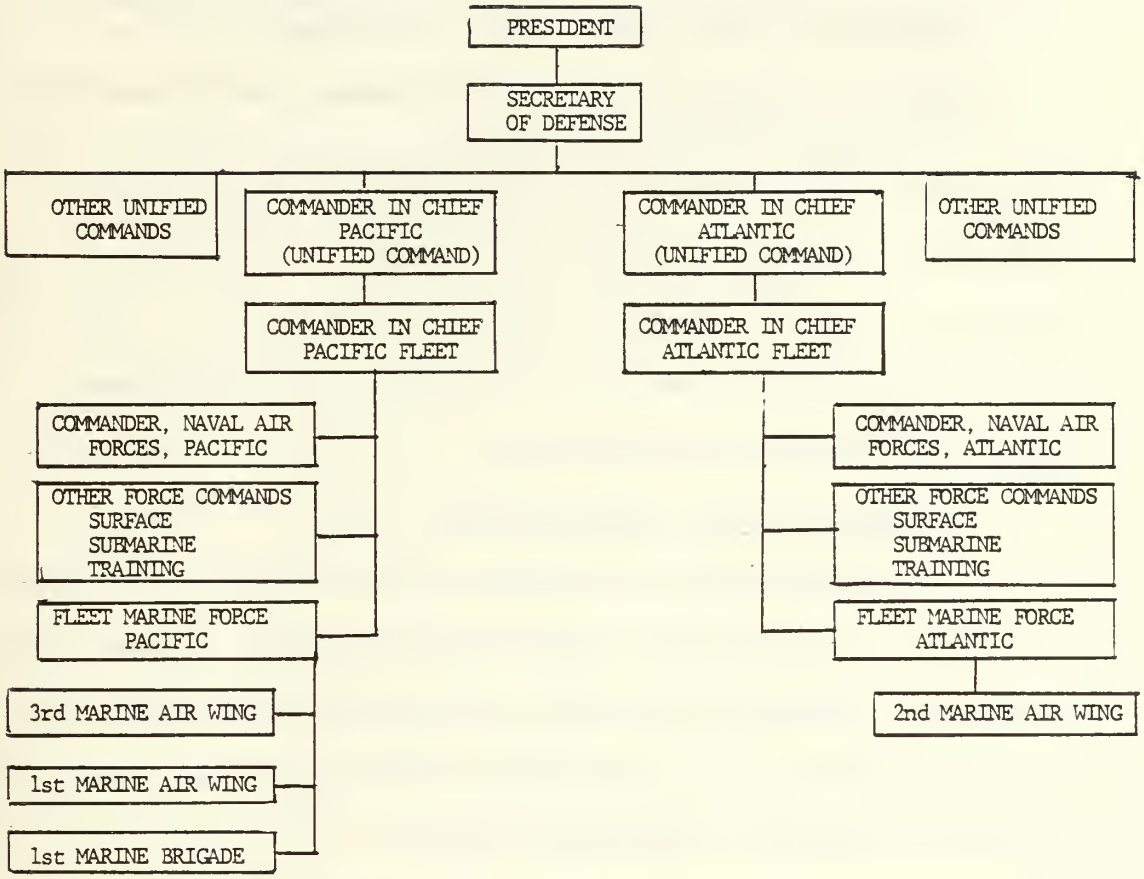

PRESIDENT
SECRETARY OF DEFENSE
OTHER UNIFIED COMMANDS
COMMANDER IN CHIEF PACIFIC (UNIFIED COMMAND)
COMMANDER IN CHIEF ATLANTIC (UNIFIED COMMAND)
OTHER UNIFIED COMMANDS
COMMANDER IN CHIEF PACIFIC FLEET
COMMANDER IN CHIEF ATLANTIC FLEET
COMMANDER, NAVAL AIR FORCES, PACIFIC
OTHER FORCE COMMANDS SURFACE SUBMARINE TRAINING
FLEET MARINE FORCE PACIFIC
3rd MARINE AIR WING
1st MARINE AIR WING
1st MARINE BRIGADE
COMMANDER, NAVAL AIR FORCES, ATLANTIC
OTHER FORCE COMMANDS SURFACE SUBMARINE TRAINING
FLEET MARINE FORCE ATLANTIC
2nd MARINE AIR WING

FIGURE 2-3. Operational chain of command.

aircraft. There are two budget lines called Operating Target Functional Categories (OFC's) that provide the direct support to flying hours. They are;

- OFC-01: Flight Operations; includes petroleum, oil and lubricants (POL) and flight equipment.
- OFC-50: Aviation Fleet Maintenance (AFM) and Depot Level Repairables (DLR,s).

There are other OFC's - indirect costs, such as ADP, transportation of people and things, Fleet photo support, Marine Air Traffic Control, aviation TAD, etc. - that figure into the ultimate cost per hour but are not a part of the FHP and will not be considered.

3. Determining requirements

To determine the budget requirement two things must be known, the cost per hour and the total number of hours required. This is done through the compilation of historical data and consolidated flying hour requirements submitted from the operating forces.

OFC-01/50 obligations and hours flown are reported monthly by squadrons to their respective Marine Aircraft Group (MAG) fiscal office. The MAG in turn submits the reports, by message, simultaneously to the wing, FMF headquarters, and responsibility centers (CNAP/CNAL). The report is called the Budget OPTAR Report or BOR and is the key financial management device in the Flying Hour Program. The BOR reports obligations by fund code for the month.

Commanders can use the BOR to balance obligations against projected plans. CNAP/CNAL use the BOR's to:

(1) Evaluate its financial situation;

(2) Support subsequent fiscal year budget submissions;

(3) Measure squadron budget performance;

(4) Prepare several management control reports, including the Flight Hour Cost Report and other Flying Hour Program reports;

The BOR provides the following information:

(1) Obligations for aircraft operations and maintenance;

(2) Applicable aircraft type equipment code (TEC);

(3) Number of operating aircraft;

(4) Total gallons fuel consumed during the month;

(5) Flight hours flown during the month;

CNAL/CNAP compiles the data and submits the Flight Hour Cost Report to CNO. The Flight Hour Cost Report is used to prepare the yearly budget for dollars, hours, and costs per hour. The net result is called the CNO Operations Plan 20, or OP-20.

The computed CPH can vary within T/M/S because of types of operations, operating procedures, or geographical location. There have been budgeting problems during the past several fiscal years because of CPH differences in high performance aircraft. The Marine Corps tends to burn more fuel per hour than the Navy because of differences in operating procedures. At the NAVCOMPT, OSD, and

Congressional level the CPH becomes an average for the T/M/S and the differences may get lost. As a result a particular Marine Corps T/M/S could end up being underfunded.

Readiness is the key factor in establishing the flying hour requirements. The Marine Corps uses Combat Readiness Percentage (CRP) as its standard. CRP is determined by the degree of completion of a Training and Readiness Manual syllabus. The T&R Manual is based on total mission readiness. It standardizes aviation training and specifies flight qualification performance requirements for aircrews by type/model aircraft. The percentage of completion of the prescribed syllabus is the basic standard by which the Marine TACAIR Flying Hour requirement is stated. The CRP range is from the minimum qualification of Combat Capable at 60% to Fully Combat Capable at 100%. The FMFPAC goal is for 80% to 85% CRP.

The fleet squadrons will submit annual flying hour projections based on historical data, projected training, and deployement requirements to their respective Marine Aircraft Group (MAG). The projections are submitted for the upcoming fiscal year and for several outyears to be used for future planning. The MAG consolidates the squadron requests and submits them to the wing, and wing to FMF headquarters. Each FMF headquarters has a FHP manager assigned to oversee the budget submission and execution of the FHP. Although he works under the Force Comptroller he also has a

responsibility to the G-3 or operations head for coordinating fiscal and operational requirements. The force headquarters then submits the total force requirements up the chain as diagrammed in fig. 2-1. The Marine Corps requirements are merged with the Navy requirements. They are then considered in terms of Primary Mission Readiness, which are those hours required to keep the average flight crew qualified and current to perform the primary mission of the assigned aircraft. This can lead to problems in understanding the program as the Marine Corps plans in terms of total mission readiness while the DON program is expressed in terms of Primary Mission Readiness. The difference is that CRP addresses a percentage of syllabus completion while PMR is the stated total requirement of the hours to meet the planned aircrew training and operational commitments. This relationship and problem of terminology will be discussed more in Chapter IV.

Meanwhile the Navy/Marine Flying Hour Program Manager (NOP-51C) at the CNO level is preparing the OP-20 report. The OP-20 establishes controls on fleet planning. The OP-20 budgets flying hours at less than the fleet requirements. For example the FY86 unrestrained requirement for Marine TACAIR was 364,819 total TACAIR hours. The OP-20 set the funding at 306,845 hours, or 84.11% of the requirement. Until FY84 the Marine PMR had been consistently below 80%, while the Navy's was over 85%. Since FY84 the Marine PMR

has been steadily increased so as to achieve parity with the Navy program in FY87. Figure 2-4 graphs the yearly relationship of Navy and Marine PMR.

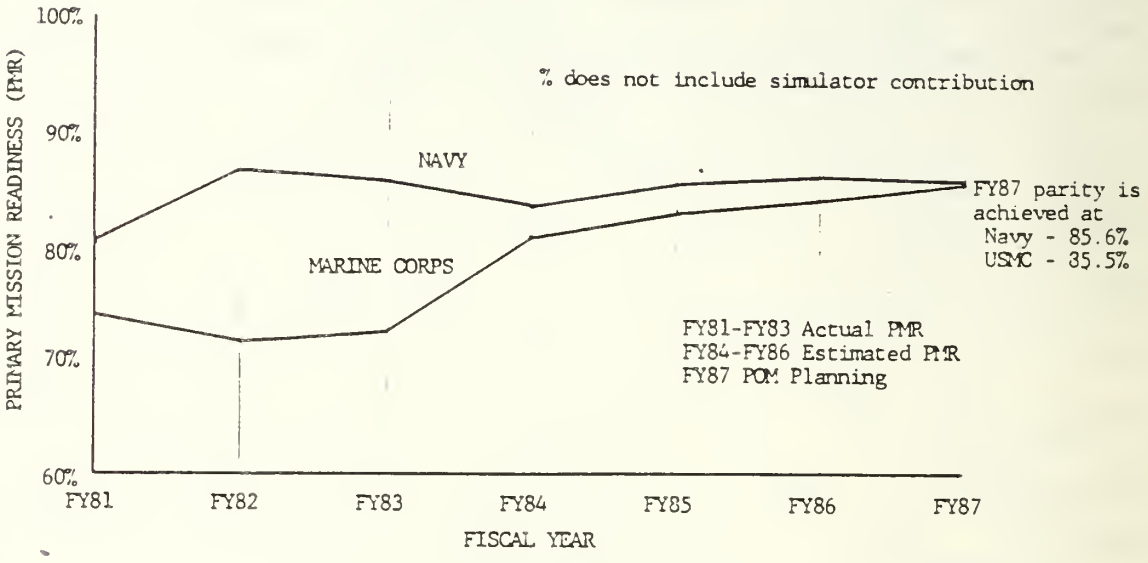


Figure 2-4. Comparison of Navy and Marine PMR, FY81-FY87

Appendix B outlines the OP-20 methodology and the structure for flying hour inputs from the fleet.

4. Budget submission

Once the OP-20 and fleet requests are consolidated the total requirement is submitted to the Comptroller of the Navy(NAVCOMPT). A NAVCOMPT analyst reviews the requirements to see if they are justifiable and defendable. The analyst plays an important role in the budget submission as he is probably the key individual in making sure that the programs are understandable by OSD and Congress.

The next level is the OSD analyst where there is less sympathy and understanding of the programs. If a requirement is not clearly and fully justified it is subject to being quickly marked. This is where the Marine Corps program often runs into difficulties. As there are differences in the way the Navy and Marine Corps operate, the requirements may be somewhat different. Since the FHP is essentially a Navy program some of the Marine Corps requirements are not stated to reflect the total requirement or are lost in the larger program. As a result some Marine Corps programs are marked because of misunderstanding the requirement and have to be won back through reclama. From OSD the budget request becomes part of the President's budget and is submitted to Congress. Congress has been funding the FHP as requested, however, there have been questions raised about certain portions of the program that could affect the Marine Corps. That is why it is important to have the requirements correctly stated and justified.

In FY83 the Marine Corps discovered some of the problems of an understated program with the underpricing of some aircraft operations. Figure 2-5 illustrates the affect of correcting the budget requirements as the total TACAIR hours executed (or planned) increased 22% between FY83 to FY87.

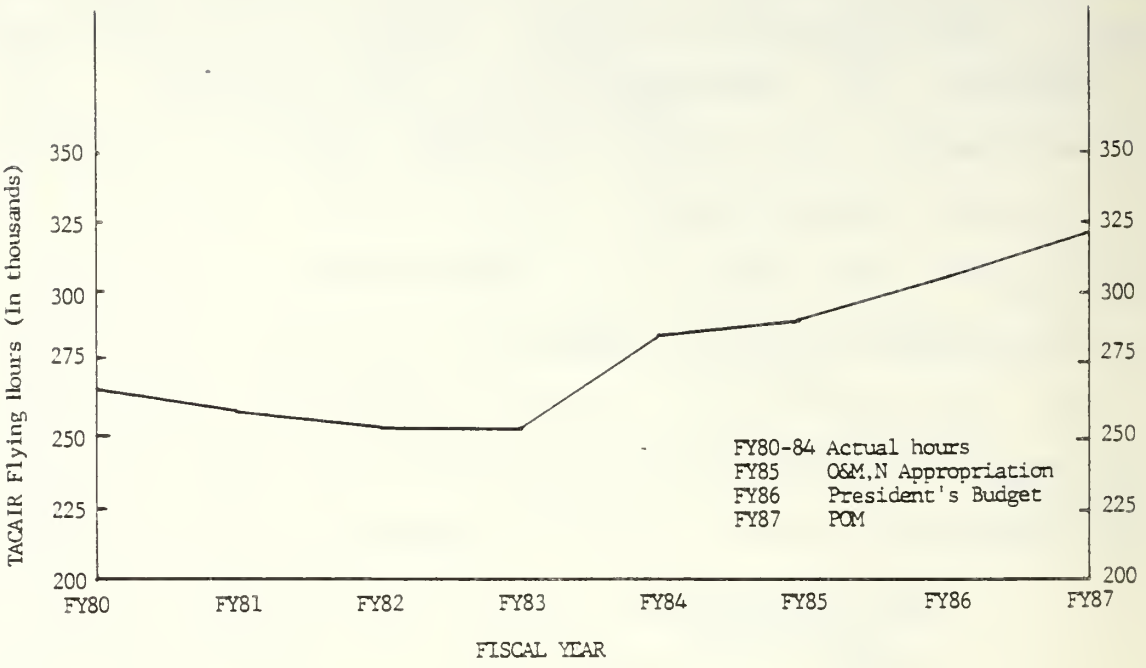


Figure 2-5. Marine Corps total annual TACAIR Flying Hours FY80-FY87

5. Budget execution

Once the budget authorization and appropriations are made by Congress the fund flow is back down through the fiscal chain to the operators in the fleet. The upper level movement and control of the funds is not important to this study and will not be described. However, any withholds of allocation by a higher command can affect the fleet's execution of their program.

As shown in Figure 2-1, the operating budget holder and thereby the responsibility center is at the Commander, Naval Air Forces level. CNAP/CNAL issue operating targets (OPTARS) to the squadrons via the force, wing, and group

commanders. This limits the FMF commanders flexibility in executing their programs somewhat.

Although there may be some argument for bypassing CNAP/CNAL in the funds flow, it is important that the Fleet CinC's maintain control as they have operational control over the FMF's and need to ensure the support is there for Fleet directed operations.

The squadrons reduce their OPTAR's by making obligations for goods and services in day-to-day operations. The obligations are forwarded to the group fiscal office which consolidate them and forward them to the Fleet Accounting and Disbursing Center where they are matched with claims and expenditures are made. The group submits the BOR's showing actual costs and hours. The BOR is then used by commanders to monitor program execution.

B. OBJECTIVES OF MARINE AVIATION

Early in the formulation stage of this thesis a suggestion had been made to look at the feasibility of making the Flying Hour Program part of the O&M,MC or green dollar account. Because of the mission, operational chain of command, and maintenance and supply structure of Marine aviation, and the fact that the Navy owns all the aircraft this alternative was discarded without any serious consideration.

The intent of this section is to provide background on the mission of the Marinie Corps and Marine aviation so as to provide a better understanding of the integral part that Marine aviation plays in the Navy's mission. The primary and collateral missions are spelled out as background to what Primary Mission Readiness means.

1. Mission of the Marine Corps

In part, from the Marine Corps Manual [Ref. 4;p. 1-3] as it refers to the Fleet Marine forces:

> Provide Fleet Marine Forces of combined arms, together with supporting air components, for services with the United States Fleet in seizure or defense of advanced naval bases and for the conduct of such land operation as may be essential to the prosecution of a naval campaign.
>
> Provide, as required, Marine forces for airborne operations, in coordination with the Army, the Navy, and the Air Force and in accordance with doctrines established by the Joint Chiefs of Staff.

The manual [Ref. 4;p. 3-3] goes on to describe the responsibilities for operational readiness:

> The Commandant of the Marine Corps is directly responsible to the Secretary of the Navy for the operational readiness of the entire Marine Corps.
>
> The Commandant is also responsible to the Chief of Naval Operations for the readiness and performance of those forces of the Marine Corps assigned to the Operating Forces of the Navy.
>
> Commanders are responsible for maintaining their commands in a state of readiness to perform their assigned mission.

2. Objectives of Marine Aviation

The legal status of Marine aviation is established by the National Security Act of 1947. It directs;

> The Marine Corps, within the Department of the Navy, shall be so organized as to include not less than three combat divisions and three air wings, and such other land combat, aviation, and other services as may be organic therein.... [Ref. 5;p. 2]

FMFM 5-1 [Ref. 5;p. 5] describes the primary and collateral missions of Marine Aviation as follows:

> The primary mission of Marine Corps Aviation is to participate as the supporting air component of Fleet Marine Forces in the seizure and defense of advanced naval bases and to conduct such land operations as may be essential for the prosecution of a naval campaign. A collateral mission is to participate as an integral component of naval aviation in the execution of such other Navy functions as the fleet commanders so direct.

The current organization of Marine aviation units for administration, operations, and training consists of wings, groups, squadrons, and missile units. There are four Marine Aircraft Wings, three assigned to the regular forces and one reserve wing. The Marine aircraft wing is task organized by various groups. Groups are composed of squadrons which provide the aircraft, support equipment, and personnel to perform assigned missions and tasks. The squadrons are the organizational building blocks employed in organizing air task-type commands.

The squadron, missile unit, and special task units are the only units within Marine aviation formed on published tables of organization (T/O's). A wing or group has no inherent tactical mission capability except that provided by its assigned T/O units. During peacetime squadrons are

manned at 90% of the T/O. Group staff officers fly with the squadrons and will augment them to 100% during wartime.

The Marine Aircraft Group (MAG) is the smallest aviation unit designed for relatively independent operations with no outside assistance except access to a source of supply. Each MAG is task organized for the mission assigned and the facilities from which it will operate.

The Marine Aircraft Wing (MAW) is also task organized to accomplish the missions assigned. Each wing may be different in organization - designed to provide a flexible and balanced air combat organization capable of providing air combat operations in a variety of areas without the requirement of prepositional support, control, and logistic facilities. The MAW is the smallest unit that can provide all functions of Marine aviation. Those functions are;

- Offensive air support.
- Offensive anti air warfare.
- Defensive anti air warfare.
- Assault support.
- Aerial reconaissance.
- Electronic warfare.

At the present time there are approximately 900 aircraft in three wings and the 1st Marine Brigade that make up the Tactical Air of the Fleet Marine Forces.

C. HISTORY OF MARINE FLYING HOUR PROGRAM

Until the early 1980's there was no Marine Corps Flying Hour Program. During the period FY 1978-1980, the Marines were unable to execute the budgeted program for various reasons as;

- Low retention of qualified/experienced aviators.
- Low output of new pilots from the Training Command.
- Shortages of high skill, experienced maintenance personnel.
- Shortages of spare parts - high cannibalization rates.
- Poor MC/FMC rates.

During FY's 1981-1982, the Marines made a concerted effort to get the program back on track, eliminating most of the deficiencies and improving in the rest.
Pilot retention improved and pilot training (undergraduate) increased. The pilot population has increased over 30 percent since the low point in 1980. Figure 2-6 graphs the trend from FY74 to FY84. In September, 1985 the Marine Corps pilot requirement was 3986 Lieutenant Colonels and below, and there was 4308, a plus 322, on hand. Appendix D gives a detailed breakdown of the pilot status for FY83 and a projected pilot inventory vs requirements through FY90. The pilot growth and subsequent overpopulation in some communities created a new problem.

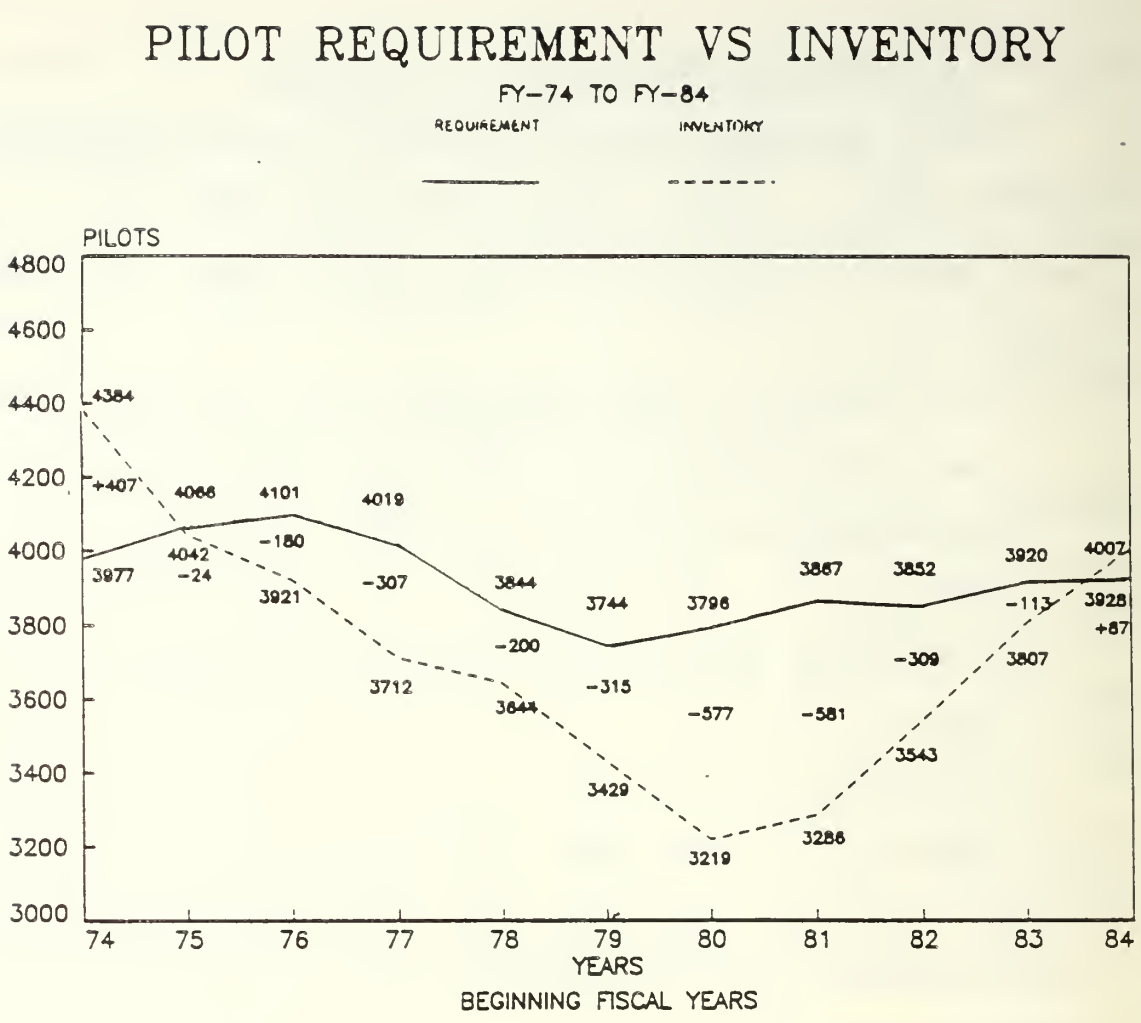


Figure 2-6. Pilot requirement vs inventory FY74-FY84

The OP-20 was understated as the crew seat ratio (CSR) was lower than that needed to support pilots on hand and thereby lowers the actual PMR below 100 percent for some aircraft. For example in FMFPAC the A-6E, UH-1N, and FA-18 had more crews than were reflected in the FY85/86 OP20 report of June 1984 [Ref. 6]. The following shows the OP-20 and actual crew seat ratios for these aircraft.

HQ	T/M/S	# A/C	CSR	CREWS
CNO OP-20	A-6E	20	1.25	25.00
FMFPAC	A-6E	20	1.40	28.00
CNO OP-20	UH-1N	48	0.85	40.80
FMFPAC	UH-1N	48	1.02	49.00
CNO-OP20	FA-18A	36	1.33	47.88
FMFPAC	FA-18A	36	1.58	57.00

As a result these aircraft end up being under-budgeted for the pilots on hand and the lower flying hours per pilot has a direct effect on aircrew readiness.

Significant improvements in the number and quality of maintenance personnel combined with an improvement in Mission Capable and Full Mission Capable rates of the aircraft increased aircraft availability and therefore improved the ability to execute the flying hour program. Those rates have risen dramatically since 1981. LtGen Keith A. Smith reported [Ref. 7] to Congress that in 1985 Marine aviation established a new overall aggregate readiness record of 75 percent mission capable. Figure 2-7 graphically depicts the rise in these rates over the past five years. Mission capable status indicates the availability of a combat aircraft to perform at least one of the missions for which it was designed. Full mission capable status indicates the availability of combat aircraft to perform the full range of tactical missions for which it was designed.

Another factor that has affected mission capable rates is that new aircraft being introduced to the fleet not only possess the latest technology, they also reflect a conscious

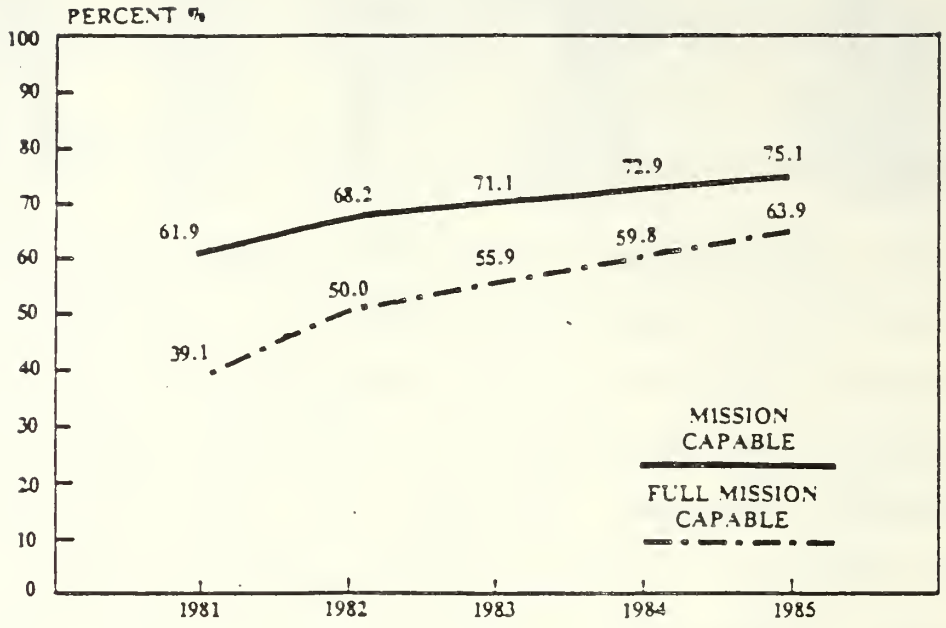


Figure 2-7. Aircraft Readiness Rates.

and concerted effort to design systems that are reliable and maintainable. For example, the F/A-18 averaged 85 percent mission capable and 82 percent full mission capable for 1985. The AV-8B in 1985, its first year, maintained a 85 percent mission capable rate and a 79 percent full mission capable rate [Ref. 7:p. 70].

As a result of the Marine Corps underflying the program prior to FY83, the Chief of Naval Operations regularly realigned funds budgeted for Marine squadrons to Navy squadrons. The net result was that the Marine percentage of PMR declined relative to the Navy PMR shown in Figure 2-4. Inspite of improvement in aircraft readiness and the Marines ability to execute the program funds were continued to be

realigned into FY83 when the Marines could have been able to fully execute the program.

At the same time it was discovered the costs per hour were incorrect. This had not been a concern previously as there was always more money than the Marines could execute. The cost per flying hour discrepancy further hindered the ability to execute the program. This came as a result of increased emphasis of the balance between operational and material readiness. Type Commanders had been realigning large numbers of flying hours among various T/M/S and in effect were outflying their support tail. The support tail are basically the spare parts in the supply system required to sustain a given tempo of flight operations so aircraft are not grounded due to a spare part not being available. The support tail is developed around projected operations and a complex model used to develope a required spares inventory. As an example suppose the F-4S was budgeted for 1000 hours but it was only flown 500 hours, and the AV-8B was budgeted for 500 hours and flew 1000. The result would be excess F-4 parts and a shortage of AV-8 parts.

In order to ensure the two programs remained balanced, the Type Commanders were advised to limit flying hour realignments to those required in support of operational requirements. According to Barber [Ref. 8] this change effectively eliminated "managing at the bottom line" and forced management by T/M/S, and focused the attention on the

cost per hour. The FY83 program was plagued by pricing problems in both fuel consumption and maintenance costs. The F-4 was being operated more at low altitudes and in after-burner causing fuel consumption to increase, and this increase was not being budgeted for. The fleet continued to fly at this rate at the expense of other programs and subsequently forced reductions in flying hours in order to finance higher costs.

In FY82 it became apparent that some action on the part of the Marine commanders that action must be taken. FMFLANT, shortly followed by FMFPAC in FY83, developed a Flying Hour Program. The office of the Flying Hour Program Manager, or Aviation Financial Management Officer in FMFPAC, was created and staffed with an aviator. The FHP Manager is responsible to the Force Comptroller, however he works closely with the G-3, Operations Office so as to tie fiscal planning and operational requirements together.

With the efforts of these managers and analysts and planners at the CNO level the pricing, parity and some other problems were corrected by FY85. It became apparent that there needed to be high level awareness and assistance at Headquarters Marine Corps (HQMC). As the program is funded through the Navy chain there was little awareness of any problems in the budget process or funds flow. There needed to be some way for Headquarters Marine Corps to monitor the program and step in with high level assistance if needed.

In May 1985 Major Jack Pettine from the Aviation Plans, Programs, Doctrine, Joint Matters and Budget Branch was appointed as a staff officer at HQMC dedicated the FHP. His roll is to keep HQMC advised on the Flying Hour Program and work with analystS at NAVCOMPT. The intent is not to scrutinize or manage FMF programs or circumvent the chain of command. If necessary, HQMC will intercede or assist on issues of sufficient magnitude. In October Major Mike Snow from the Fiscal Division was assigned as an advisor to work the program and to keep the Fiscal Director advised.

All personnel involved in the Flying Hour Program now meet annually for a Flying Hour Conference at HQMC just prior to the Navy Flying Hour Conference to discuss problems and coordinate their programs. The objectives of the conference are to identify those issues the Marine Corps program managers want presented at the CNO Flying Hour conference, and to develope a united USMC position.

The Marine Corps Flying Hour Program is well established and working towards a goal of maximum effectiveness. The program was built through the efforts of individuals like Jay Heffernan, Dick Crawford, Rick Herrington, Dick Ward, Greg Barber, Carl Franklin, Mike Snow, C.A. MacNiven, J.K. Stringer, J.M. Chance, and many others.

III. RESOURCE LIMITATIONS AND READINESS

As the budget deficit and the Gramm-Rudman-Hollings legislation so dramatically point out, the resources available for defense are limited and the Congressional mood is not favorable to increases in defense spending. This chapter looks at the general question of cost and effectiveness in terms of resource limitations versus defense capability, especially that pillar of defense capability called readiness. What should the goal of the Marine Corps Flying Hour Program be - to maximize effectiveness for a given cost or to minimize cost for a given effectiveness? For any changes in resource inputs what will the effects on the returns of capability? Can the effects be measured? These are current and vital questions and will be examined in the light of up-to-date research.

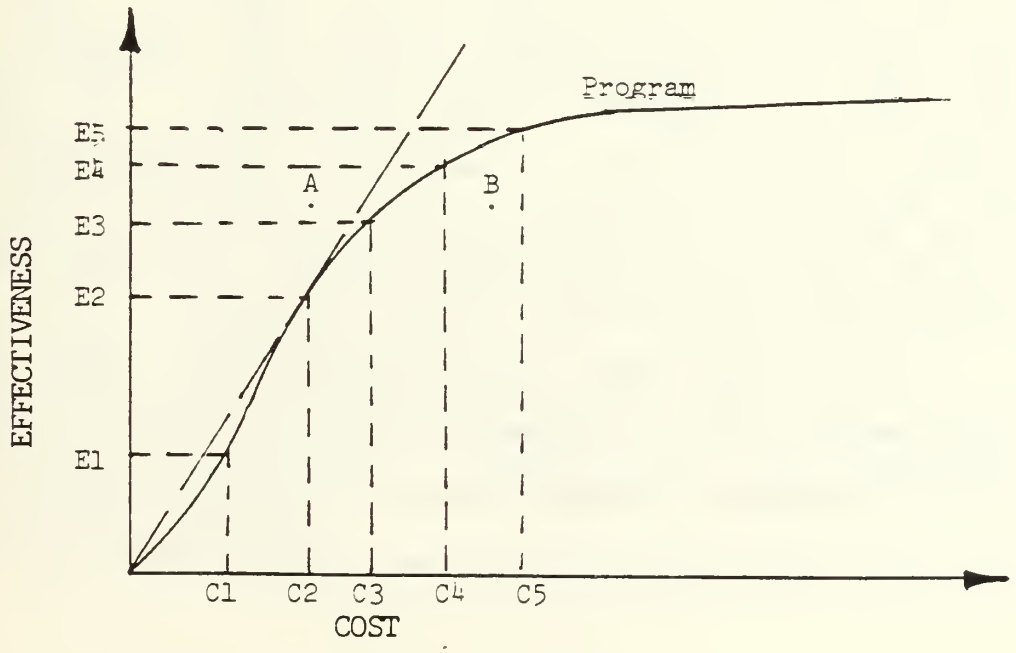
A. COST, EFFECTIVENESS AND EFFICIENCY

The costs of a program are those inputs or resources utilized towards attaining the stated objectives or goals of that program. Effectiveness is the level or degree that program uses those resources to achieve the intended or expected effect. In this case it is how well the Marine Corps Flying Hour Program meets or prepares for the objectives stated in chapter 2. To be efficient is acting or producing effectively with a minimum of waste, expense or

unnecessary effort. In general terms efficiency is simply the making good use of resources.

Figure 3-1 provides an illustration of the relationship between program costs and its effectiveness. The figure assumes that for any given input on either axis there is a given output for that particular program. Both the proposed expenditure and the effectiveness should not be specified at the same time; this over specifies the criterion and can result in asking for alternatives that are either unobtainable (point A) or underdesigned (point B). The cost increments are increased by equal amounts along the cost axis. If the cost was fixed at C1 the output would be E1. By increasing the cost to C2 the output would increase to E2. Increasing to C3 through C5 the increase in effectiveness returns increase at a diminishing rate as the

Figure 3-1. A cost-effectiveness comparison



curve flattens out. In this area of diminishing returns it becomes senseless to continue to increase the level of input. The optimal point is to maximize the ratio of effectiveness to cost. The best effectiveness-cost ratio is the slope of a line drawn from the origin to a tangent point on the curve. At that point of tangency, or knee of the curve, the program is returning the best effectiveness to cost. This approach of setting maximum cost so that it corresponds to the knee of the curve cost-effectiveness is useful and prevalent.

Figure 3-1 is not a model of the cost-effectiveness curve of the Marine Corps Flying hour Program, it is just for illustrative purposes. However some relationships can be made. Cost would be O&M,N dollars allocated or it could be flying hours planned. Effectiveness could be primary mission readiness, the criterion used to establish the level of funding for the Flight Hour Program. Figure 3-2 illustrates the relationship between flying hours - the input cost and Primary Mission Readiness - the measured output of effectiveness. The graph uses FY84 TACAIR data and is not to scale as the program might actually be but it can be used to illustrate a couple of points.

First, the best cost-effectiveness ratio is at approximately 60% of Primary Mission Readiness while the executed program of 285,309 hours for Marine TACAIR produced 81.7% (includes simulators) Primary Mission Readiness. The

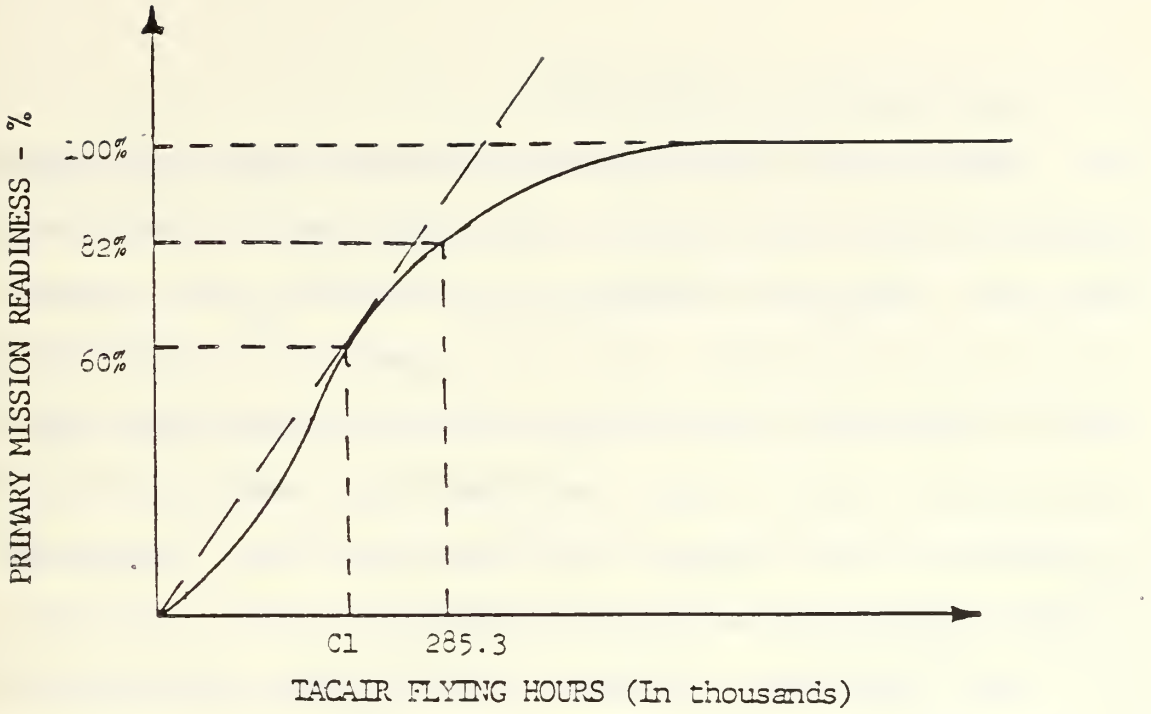


Figure 3-2. FY-1984 comparison of flying hours and Primary Mission Readiness.

program would never be budgeted at 60% as that would be an unacceptable level of readiness. As discussed previously 85% is the current and acceptable goal.

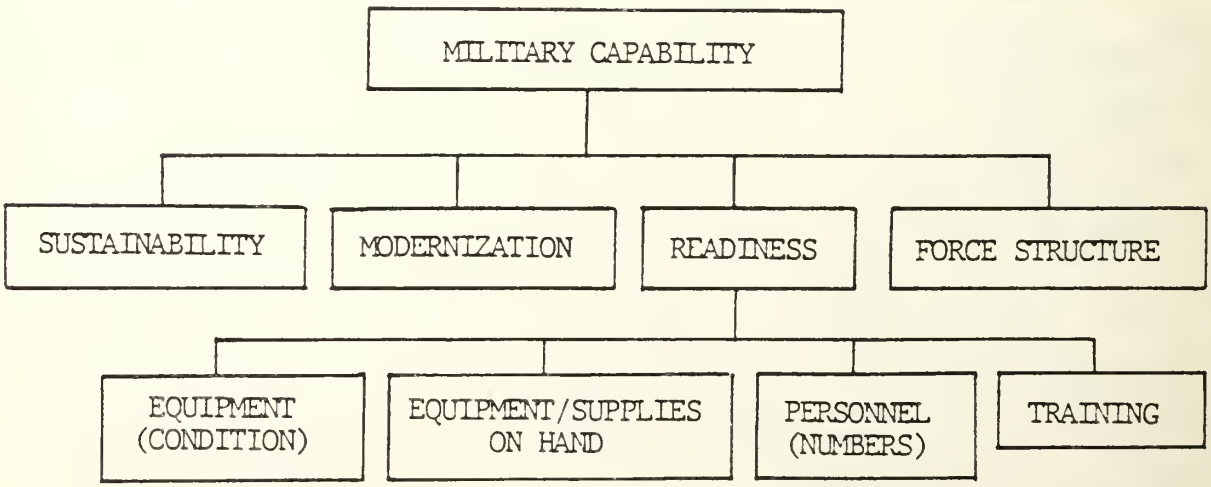
Second, why not try and achieve 100% readiness? As can be seen by the curve 100% would increase the costs dramatically. There are a number of factors that make the 100% goal nearly impossible to achieve at any cost. Continual turnover of pilots coming from and going to non-flying jobs, new pilots coming out of training squadrons, the highly degradable nature of currency qualifications, situations where certain types of sorties cannot be flown. all restrict the entire TACAIR force from achieving and sustaining 100% PMR.

B. MEASUREMENTS OF READINESS

Congress asks questions about current state of military capability and what DoD is getting from the funds being spent for national defense. It is a difficult concept to quantify and measure. The U.S. General Accounting Office (GAO) concluded in a recent report that there is no quantitative measure that describes the general warfighting capability of our forces, and DoD doubts that a meaningful single measure can be developed [Ref. 2:p. 2].

The Department of Defense defines military capability as `the ability of the force to achieve a wartime objective (win a battle or a war or destroy a target)'[Ref. 2:p. 1]. Military capability is made up of several `pillars' as diagrammed in Figure 3-3.

Figure 3-3. Pillars of military capability and readiness.



Sustainability - staying power of our forces during combat operations. Represents our ability to resupply engaged forces with replacement manpower, equipment, and other supplies.

Modernization - qualitative, technical capabilities of our weapons systems and equipment.

Readiness - collective ability of the force to deliver the outputs for which they were designed, to include the ability to deploy and employ without unacceptable delay. Essentially a pre-D-Day measure of the personnel and material health of our force relative to wartime requirements.

Force structure - numbers, size and composition of the units that comprise our defense forces.

The chief area of concern of this study is that of readiness. As can be seen in Figure 3-3 readiness is broken down further into four more areas. Congress would like to know more about readiness and the affects of the budget on readiness, especially what affects changes in funding have. Although a unit's readiness is heavily influenced by the amount, type, and quality of training it receives, the services cannot determine precisely how readiness is affected by changes in the level of training activity, with training being the key element of the Flying Hour Program. No one unit training program, evaluation, or inspection

gives a commander solid evidence that his unit is trained at any specific level of readiness. However, the services individually and collectively evaluate how well units can perform wartime missions. From these evaluations come a myriad of quantitative and subjective indications which highlight unit strengths and weaknesses. Although there is no single indicator of readiness, more indicators pertain to readiness than any other pillar of military capability. There is a problem with linking these internal reports with outside interests. DoD managers may not be completely frank in assessing readiness, sustainability, or capability if they know assessments will be used outside DoD.

Program goals and objectives for operational units are typically expressed in terms of resources consumed or required, such as hours flown. However, they are not designed to identify the effect of increasing or decreasing funding levels.

There are several reports that address readiness from the Congressional level down to those reports that specifically report on Marine Corps aviation readiness.

1. Force Readiness Report

An annual report to Congress in support of the President's budget. It is intended to give Congress a description of the current readiness of the force and an overall assessment of the readiness expected to result from passage and execution of the defense budget. It

is probably DoD's most comprehensive compilation of readiness indicators. According to a recent GAO report [Ref. 3:p. 21] the FRR does not fully identify the readiness that will be achieved with the budget the Congress is considering. Although it provides details about training activities, such as flight hours, it does not quantify the extent to which training affects readiness. It has limited utility in budget analysis because it does not address how readiness will be affected if Congress chooses not to authorize and appropriate funds at levels requested by DoD. The weaknesses of the FRR and its relationship to the Flying Hour Program will be dealt with more extensively in Chapters 4 and 5.

2. Unit Status and Identity Report (UNITREP)

The primary system for reporting unit level readiness within DoD. An internal DoD management tool used by the JCS to monitor status of military units. Units report in terms of combat readiness ratings C-1 to C-5 designed to measure the unit's ability to perform its wartime tasks by assessing the peacetime availability and status of resources possessed or controlled by the unit in the four resource areas of personnel, equipment and supplies on hand, equipment condition, and training. The C-ratings are;

C-1 fully combat ready
C-2 substantially combat ready
C-3 marginally combat ready

C-4 not combat ready
C-5 service programmed not combat ready

JCS uses the UNITREP as an input source for the JCS Capability Report and the annual JCS Posture Statement to Congress, as a medium for readiness briefings within DoD, and as an indicator of problems and potential need to reallocate resources. It is not intended to be used externally.

3. OPTEMPO Report

A high level Navy report that reports the operating tempo of the fleets. It is a fairly simple reporting program execution and cost by numbered fleet. Flying hours and dollar cost are reported for air and steaming days and dollar costs for ships. Marine aviation is included in the report. There are four basic catagories on the report; training, major exercises, contingency operations (will be funded by supplementary appropriations if necessary, as with the Grenada operation), and operations and service support. This report gives a better breakdown of the type of operations the money is used for. In this report Marine execution is not differentiated from the Navy's and can cause some problems because it does not highlight differences in the way the services may operate.

4. Marine Corps Reports

There are a number of reports, evaluations, standards and systems that reflect the effectiveness of the Marine Corps Flight Hour Program. They are listed in Appendix C. These indicators are basically internal for use by commanders at all levels. Some of the data such as Combat Readiness Percentage (CRP), hours and sorties flown, Mission Capable (MC) rates, safety records, accident free hours, performance in wartime, and C-Ratings are utilized by the high level command structure, analysts and above.

C. THE CRITERION

To conduct a good cost vs effectiveness analysis there must be a well established criterion to measure the significance of the consequences of changes to the inputs. The example of Figure 3-2 used Primary Mission Readiness percentage as it is the basic criterion used by Congress, DoD, and CNO for funding the FHP. However PMR, or Combat Readiness Percentage (CRP) as it is referred to in the Marine Corps is merely a measurement of training syllabus completion and is only one indicator of the actual combat capability of a unit. For example, participating in an exercise may utilize a large number of hours and gain aircrews invaluable experience but only achieve a small increase in CRP. A pilot may complete a syllabus requirement in one sortie but he may not be truly

comfortable in performing that particular skill until he has done it a number of times, and that repetition may not increase his CRP. In reality he has achieved a higher state of readiness but there has been no change in a quantifiable indicator.

CRP or PMR percentages may be misleading if used alone. This was pointed out by the GAO reports. A change in flying hour funding may not affect the readiness percentage by a predetermined or predictable amount. One factor is the non-training support and administrative sorties a unit flies. These hours are paid for from the same funds yet do not change readiness percentages. As an example, suppose funding was reduced and aviation units were directed to maintain the same level of readiness. This could be done be reducing support type missions by turning down requests for air support in training exercises of ground or other aviation units. Those units that do not get the air support now have lost their training and the aircrews that would have flown the sorties have lost some valuable experience. The final result is that the quantifiable readiness indicators have remained the same at reduced cost, but the overall readiness posture of the Marine Corps has lost.

Similarly, if funding were increased there may not be an equivalent increase in CRP/PMR. As explained previously the higher percentages would take more to achieve and maintain--it would cost far more to increase one percent

overall at the 90% level than it would at the 75% level. A squadron that has been given additional hours may waste hours on nonessential flights and accept missions that have no particular training value to anyone concerned and would have previously been turned down.

D. CONCLUSIONS

Because of a lack of a good criterion there is no way of accurately knowing the effectiveness of cost changes in the Flying Hour Program. Program managers and commanders will certainly know the affects, however the problem is in communicating that to the analysts at the Secretary of Defense level and Congress. The Marine Corps TACAIR funding comprises less than two percent of the O&M,N appropriation alone. When considering the overall defense budget that OSD and Congress must be concerned with, the Marine Corps Flying Hour Program is a small concern so the program requirements must be stated correctly and precisely.

The Marine Corps can improve the efficiency of the program from within and can make it more effective without necessarily relying on funding increases. That is not to say that funding increasees are impossible. There must be a concentrated effort to get the requirements correctly stated in Marine Corps terms. Time is an important factor. The longer the program goes being incorrectly stated the harder it will be to change.

IV. PROBLEMS

This chapter deals with the problems of the Flying Hour Program. Chapter V will examine alternatives to the problems. The problems are discussed as three major areas. The first and most critical area is how the requirements are stated or defined. In general, this affects both the Navy and Marine Corps, however there are several Marine Corps specific problems that are factors in the modeling of requirement determination that will be discussed. Stating the requirement incudes such areas as PMR, cost per hour, crew seat ratios, pilot population, staff hours, simulators, Navy-Marine differences, and measurements.

The second area looks at program management. Here the the chain of command, unit deployment, training of accounting personnel, and communication between operators and managers are discussed.

The third area is concerned with the understanding of the program by all of those who are involved in it.

A. STATING THE REQUIREMENT

With the evolution of the Flying Hour Program and the growth of the cost of flying hours a number of questions have been raised within the Navy and Marine Corps concerning

an adequate measurement of flying hour requirements. Similar concerns have been raised by both OSD and Congress. Marine managers feel that their requirements are underfunded because they are not stated correctly and are understated. Throughout all levels of the program it is easily misunderstood. This section deals with those items that have been factors in the problem of program understanding.

1. PMR

The basis for programming of flying hours has, for several years, been defined by primary mission readiness (PMR). PMR may well be the least understood acronym in both Congress and the defense establishment. Many knowledgable people consider PMR to be a direct measure of operational readiness since the term "readiness" is a part of it. There is no correlation between PMR and the C ratings of the UNITREP system. PMR is not a measure of operational readiness. PMR is simply a statement of the flight hours required per crew per month to conduct training in a specific aircraft flight syllabus, and does not vary with changes in the operating environment, operating tempo (OPTEMPO) or crew qualification. The definition of PMR is limited to aircrew training and does not recognize the flight time requirements associated with fleet tasks and commitments. There are some managers who will use the term primary mission requirements [Ref. 9] as a statement of how they see the program.

Congress has been told that a given level of dollars will achieve a given level of primary mission readiness. The problem is, what does that really mean? The indicator of accomplishment used by the Marine Corps is the percentage of completion of the T&R Manual or CRP which is no more than training accomplishment. The Navy equivalent is the "Liberty Elite" program which is similar to the T&R Manual. In essence they are expecting a quantifiable level of readiness, but are getting a level of training.

Looking at the program in this light if the program is funded at 88% the reasonable assumption is that the return will be 88% CRP or Liberty Elite completion. However, fleet operations comprise a large part of the FHP. PMR does not acknowledge fleet operations so both fleet operations and support are conducted at the expense of primary mission training. Fleet operations would include exercises, special tasking, integrated operations, and surveillance missions. Service support would include adminstrative and service flights and maintenance check flights. Figure 4-1 depicts the flying hour requirements as fixed and variable costs. The fixed costs are the aircrew training goals and the variable are the non-training hours. If there is a fenced ceiling it could affect aircrew training, and readiness as seen by the decision makers is degraded. Planners take the extra non-training hours into account when developing the

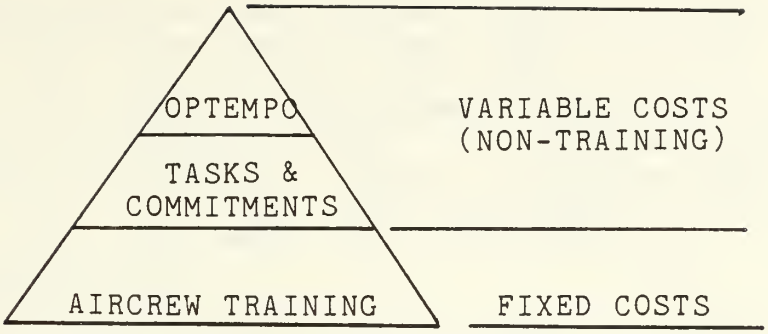


Figure 4-1. Breakdown of flying hours.

budget requests, but they are beating the system by doing this.

PMR is very structured and does not allow for changes in operating tempo. The Navy flying hours fluctuate between deployed and non deployed status. While deployed, a squadron will operate at high levels, usually well in excess of the funded PMR rate. However, when the squadron returns it will stand down and the tempo will go below the PMR rate and the hours will average out. Readiness will degrade, but that has been planned for. The Marine Corps does not operate this way. The squadrons are required to maintain readiness year around so there is no real stand down and they simply resume normal day to day operations. When they deploy the operations increase and PMR does not account for those extra hours.

A system is needed that will be sensitive to operating tempo - to deployment schedules, unit detachments, known exercises - to establish realistic requirements by T/M/S.

With a budget ceiling and an expected rate of return there has been a tendency to inflate the low cost hours to get PMR and stay in budget. This can be done two ways. One way is to decrease the hours of the high burner type aircraft, such as F-4's, A-6's, and F/A-18's, and pump up hours of low cost aircraft such as helicopters and OV-10's. As an illustration of the effect of low cost aircraft, about 65% of FMFPAC's aircraft cost under $1500 per hour to operate while only 52% of FMFLANT's are below $1500. Table B of Appendix A shows that the FY87 CPH for FMFPAC is $281 less than FMFLANT's.

Another way would be to restrict operations so the the cost per hour is lower. There are several ways this can be done; fly at optimum mission profiles, limit use of after burner, use simulators more, etc., however, some training and readiness would suffer.

2. Cost Per Hour

Although the problems that existed with the cost per hour in 1983 have been overcome CPH still continues as a potential problem for the program. It is now generally recognized that differences in operating procedures affects fuel consumption and the resultant cost per hour. If a change in CPH is not fully substantiated when an increased request is made the difference may be lost in budget analysis. The projected FY87 rates for the F/A-18 were increased from an actual usuage figure of 24.2 barrels per

hour to 26.0 barrels per hour. This change was based on the Marine rates as they were using the aircraft more aggressively and burning more fuel. However OSD marked the increase as the increased fuel consumption was not adequately substantiated.

If the operating units make a change in tactics that require higher power settings or operations under conditions that consume fuel at a higher rate than previously and these changes are not communicated to the planners and program managers the costs are not adjusted and the OP-20 is not updated. As a result the operators are upset when their programs are not funded adequately in the next budget cycle. As an example 204,000 hours might be budgeted for in FMFPAC, but because of differences between OP-20 and actual CPH they may be able to only fly 201,000 hours for the funded dollars.

3. Crew Seat Ratio and Pilot Population

The Crew Seat Ratio (CSR) is one of the factors of the OP-20 model. It comes from a computer model called the TAC Fliers Model developed by the Air Force. It considers such things as sortie rate in wartime and many other elements such as crew rest, leave, maximum hours that can be flown by a pilot in a day. From the computation of all the inputs the result is the maximum sustainable sortie rate of the aircraft and the number of crews that it would take to support this rate. The ratio is the number of aircrews per

aircraft. If the CSR was 1.3 pilots per T/M/S and there were 20 aircraft in the squadron then it would take 26 pilots. Manpower at HQMC developes the T/O for that squadron based on the force structure and CSR. During peacetime, squadrons are normally manned at 90% of the T/O.

Marine operators feel the ratios are too low throughout the community and should be revalidated. It becomes a question as to whether the ratios are too low or the pilot population is too high. As explained previously there is an overage of pilots in many of the squadrons. If the requirement was based on 26 pilots at 25 hours per month the requirement would be 650 hours per month. If there were really 30 pilots in the squadron the budgeted time per pilot would be reduced to 21.7 hours per month.

Some of the problem lies in the understanding of what the crew seat ratios are. Some feel they are simply the number of aircraft divided into the available number of pilots. There is also a belief that there are seprate CSR's for peacetime and war.

4. Staff Hours

Staff pilots are those pilots assigned to a wing or group billet in a status of "Duty in a flying status involving operational or training flights" [Ref. 10:p. 10-2] or DIFOPS. The principle is that the staff pilots can achieve and sustain a level of training and currency and will be the principal and immediate source of combat

augmentation for combat losses in a wartime situation. Additionally, staff pilots are an excellent source of highly qualified and experienced pilots and can augment the regular training pilots. At the beginning of FY86 FMFLANT had a requirement for 81 staff pilots and FMFLANT had a requirement for 161 staff pilots [Ref. 11].

All pilots in a DIFOPS status are required by NATOPS (Naval Air Training and Operating Procedures Standardization) instruction [Ref. 10] are required to fly an annual minimum of 100 hours. The total staff hour requirement is programmed into the OP-20 computation (see Appendix A) prior to the CNO constraint. What is ended up being funded is 85% (using FY87 PMR percentage for TACAIR) of the requirement, or 85 annual hours. However because NATOPS still requires those pilots to fly 100 hours, the deficient hours must be flown at the expense of the squadrons PMR hours.

Recognizing this problem the Marine Corps addressed the issue in the POM 87 request and substantially increased the staff hours over FY85 levels. In just five T/M/S (A-4M, UH-1N, CH-46E, KC-130, and AH-1) aircraft the total change was from 5,948 actual hours in FY85 to 13,724 hours in FY87 - a difference of 7,776 hours [Ref. 12]. NAVCOMPT felt it wasn't justified and OSD simply didn't believe the big change. As a result the FY87 propsosal was marked back to the FY85 level.

The problem may get more critical in the future for the following reasons;

- As tactics and equipment become more complex there will be a need for staff pilots to get more quality time in squadron aircraft if they are to be a viable combat augment.
- There will be a requirement to be as good as squadron pilots.
- Flying may become tactical or nothing at all - pure proficiency flying may disappear.

Staff flying hours must be funded at the full requirement and the Marine Corps must find a way to communicate this requirement to the decision makers.

5. Simulators

In a report [Ref. 13] conducted because of the fuel shortage crises of 1973, the Government Accounting Office recognized that significant savings could be realized through the increased use of cockpit flight simulators in place of flight time. The report recommended that the Navy and Air Force use simulators as much as possible to maintain desired proficiency.

The original goal was to replace 25% of the flight hours with simulator time by 1981. This was soon realized by the Navy as being unrealistic and was reduced to 4%, and eventually reduced again to the present goal of 2% of PMR.

According to Franklin [Ref. 14:p. 6] the current Navy policy on flight hour substitution is that flight simulation utilization is a basic building block in the total training program. It is not the Navy's intent to use simulators to replace the aircraft in training, but rather to augment and enhance training in the aircraft to the maximum effective extent. The Marine Corps agrees with the basic policy that flight simulators are necessary to augment and enhance flight training but not at the expense of a reduced flying hour program.

Franklin [Ref. 14:p. 45] went on to reveal that the Marine Corps flight simulator program was inconsistent from year to year and between aircraft communities. He went on to recommend that a logical and systematic approach to deriving simulator hours could be implemented.

The Marine Corps, however has continued to resist the full implementation of flight simulators. Table D of Appendix A shows that simulator usuage by the Marine Corps from FY81 through FY87 never rises above 1%. In the POM87 PBD the Marine Corps' FHP was marked $5.9M because of the large difference between Navy and Marine usuage. The OSD analyst felt that the Marine Corps should be using flight simulators more.

The problem is that in the early 80's the aircraft the Marine Corps had were relatively simple aircraft and there were few simulators in use. As more complex aircraft

(CH-53E, F/A-18 and AV-8B) were introduced the simulator program did not keep pace. Simulators have not been updated with the aircraft and are not available when the squadrons deploy.

Although Congress and OSD keep asking for more simulator usuage and look for the cost savings the operating community has found that they can only do so much and cannot replace actual experience. With flying hours limited the the experience value of actual flying time is very high. Although there may be a dollar cost saving when one hour of flight time is replaced with one hour in the flight simulator there is an opportunity cost of experience that cannot be measured.

6. Navy - Marine Corps Differences

There are some differences in the way the Navy and Marines operate and those differences can create different requirements.

The Navy squadrons work in cycles around deployment schedules. While deployed they will operate well above the PMR rate, however when they return to a shore base they will stand down and operate at a reduced rate. Overall flying hours average out at the PMR rate. The Marines have a requirement to maintain readiness year around. On deployment they operate at the increased rate and upon returning they do not stand down so they will operate at a higher overall rate, requiring more hours overall.

There are differences in T/M/S operating procedures that can affect costs. The F-4 and F/A-18 are two aircraft that serve as examples. The Marines operate at higher power settings and in after burner more often. As a result more fuel is consumed and the cost per hour is higher. This was a real problem in FY83 when the Marine Corps lost a substantial number of hours due to differences in cost per hour of the F-4. The same problem arose for FY87 with the F/A-18 when the POM was submitted. Because the Marines flies the aircraft more aggresively the CPH for FY84 was too low and was increased substantially for FY87. The PBD reduced the funds back to FY84 levels as there was a lack of substantiation for the increase.

The problem is that the Marine Corps program gets lost into the overall DON program. As can be seen by Table B of Appendix A, the Marine TACAIR program is less than 20% of the overall DON flying hour program. Analysts and decision makers are inclined to assume that some of the problems that exist with the Navy will also exist with the Marine Corps. When the O&M,N budget was marked it was done with a broad brush based on what the Navy is doing.

Less steaming days were scheduled for the ships and therefore the assumption that less hours for fleet support would be needed so a certain amount of money was cut, including the Marine Corps which is not affected by steaming days.

The Navy has a shortage of aircrews so the budget was marked by an appropriate amount. The Marine Corps was marked similarly eventhough there is a surplus of aircrews. Manpower is a Marine Corps budget item and was not seen by the same analyst so there was no way for the O&M,N analyst to be aware of the real situation.

There is a problem as to who will make the reclamas to the marks. As it is a DON budget request it may be difficult for both the Navy and Marine Corps to make seperate reclamas, so the Navy may represent both. The danger is that the Marine problems may not get the same amount of time as the Navy's.

The Navy's OPTEMPO report shows flying hours executed by numbered fleet. Marine TACAIR flying hours are reported as part of the Navy's. The report is Navy generated based on Navy needs and it does not reflect a true picture of Marine operations. Shore based deployments/exercises do not show up as such but are reported as training. It appears the Marines do all the training while the Navy does all the operating. This makes the Marines vulnerable to cuts to beef up Navy training.

7. Training

TACAIR loses hours to training. The Department of the navy has mandated that the Fleet Readiness Squadrons (FRS) be funded at 100%. These are the units that provide transition and refresher training to aircrews. The planned

hours are underfunded because the budget does not show what it really costs. The hours that are budgeted for are the student's hours but there are a lot of fixed cost, or overhead hours in the program that are not reflected. such as;

- Maintenance flights
- Aborts
- Section leaders on formation flights
- Ferry flights
- Any non-syllabus flight
- Instructor under training (IUT)
- Administrative flights

For every 100 hours there are roughly 25 hours of overhead, so the requirement should be 125 hours. However the funding is based on the syllabus hours. The real training load should be identified. The numbers may end up being manipulated to meet requirements. The result is that less training is ultimately accomplished or the money comes out of TACAIR.

8. USMC Policy

At the present there is no real USMC policy or flying hour program. The programs in the FMF's were developed unilaterally by each Force - FMFLANT in 1982 and FMFPAC in 1983. The Marine Corps is developing a flying hour program as evidenced by the assignment of staff officers at HQMC as program coordinators and the annual

Flying Hour Conference. The lack of a unified position, supported by CMC has hurt the Marine position at the higher levels.

B. PROGRAM MANAGEMANT

This section is about the flying hour program management from the budgeting policies at the Department of Defense and Congressional level down to the squadron commander. In particular the areas to be discussed are;

* Budgeting priorities.
* Problems associated with being a part of the Navy fiscal system.
* Unit deployment crossfunding.
* Communications betweens operations and fiscal.
* Training of group accounting personnel.

1. Budgeting Priorities

In a study by Horowitz [Ref. 15] in 1982, he inferred that the United States spends too much to buy new hardware, and not enough to man and support it adequately. He felt that part of the reason may be that the political process and the timing of expenditures conspire to make hardware easier to sell and support easier to cut. Perhaps this is due in part to the inability of the sponsors of support to justify their requests in terms that appeal to the decision makers.

Procurement gets the glamor and the vendor support. Relatively few contractors are affected by O&M and manpower budgets which are the principal appropriations that keep aircraft flying and ships at sea. Steaming and flight hours often take a low priority when put up against procurement projects and do not always get the support they need. This can be evidenced by some of the O&M,N marks being made because there was insufficient justification although the requirement really existed.

2. Fiscal Chain

As was shown in Figure 2-1 the funds flow of the OP-20 is through the two major claimants, CINCPACFLT and CINCLANTFLT. The operating budgets (OPBUD's) are held by the air type commanders, COMNAVAIRPAC and COMNAVAIRLANT. The FMF commander is best described as a conduit of funds for FMF aviation. The FMF commander is not even an OPTAR holder for OFC 01 (fuel) or OFC 50 (50) funds.

The FMF commander performs many of the tasks of the OPBUD holder, but is at the mercy of the air type commander. Some of the tasks performed by the FMF commander are;

- Budget formulation
- Budget execution
- POM developement
- POM iniatives
- Establish performance goals
- Establish FHP hours/goals

The expertise on the O&M,N funded FMF aviation rests at the force comptroller level - not at CNAP/CNAL, HQMC, or at CNO. The FMF commander currently develops its OP-20 within hour/dollar controls established by the OPBUD holder. However, the current situation gives the FMF commander little flexibility or independence in controlling the program. Some degree of flexibility may be given by the OPBUD holder depending on the individual. In short, he does all the work without the reward of running his own show.

The force commander should have the flexibility to move dollars between programs. There are many occasions during a year when there are good reasons to move funds from one T/M/S to another. One community may be having maintenance problems and cannot fly the hours funded and another may have participated in a couple of exercises that burned up more hours than planned and is facing a shortfall. The commander should be able to act quickly and not have to exercise a message drill with justifications to get the approval.

Other problems that exist by being in the Navy system were explained in the previous section.

3. Unit Deployment Crossfunding

Squadrons regularly deploy from one fleet command to another. For example the Second Marine Air Wing usually has two squadrons deployed to WestPac at any given time. The squadrons are under operational control of the First

Marine Air Wing and under administrative control of the 2nd MAW. The OFC 01 funds goes with the squadrons and the OFC 50 funds are transferred to COMNAVAIRPAC. The OFC 01 is based on at what level that unit is funded and the OP-20 CPH. The OFC 50 is based on a Lant/Pac average of CPH for maintenance.

In WestPac the CPH is normally higher so the squadron cannot fly the hours budgeted. The squadron is now dependant on COMNAVAIRLANT to approve additional funds or fly less. If funding is tight then the squadron loses some valuable flying time.

A similar situation occurs when a squadron is deployed aboard ship under a different fleet commander. The deployed squadron is funded based on projected flying hours for that deployment. If the Carrier Air Group (CAG) commander flies the squadron past the budgeted hours he can ask for more funds from the claimant. As an example two F/A-18 squadrons from FMFPAC deployed aboard the Coral Sea under CAG 13 and COMNAVAIRLANT. CAG flew the squadrons in excess of the planned hours and requested more money from COMNAVAIRPAC. FMFPAC ended up having to reprogram from another OFC to support the requirement. FMFPAC had to get permission from COMNAVAIRPAC as they do not have the authority to do it on their own.

FMFPAC has no control over how the assigned funds of a shipboard squadron can be spent. It is up to the CAG's to

decide and Navy squadrons could be tasked to fly more using funds funded for Marine squadrons. FMFLANT does not have the same problem because CAG's cannot use Marine money to fly Navy aircraft.

4. Communications

Operators from the wing staff may lose sight of the fiscal impacts of things they may do or of which they have knowledge of. A new tactic could be instituted that burns more fuel and affects the cost per hour. If the operators don't communicate that change to the fiscal managers they will not be able to adjust the requirement, and the funding will remain at the old level.

New aircraft may be delivered to a squadron early or late, and that will impact on the total hours a squadron may fly. That information must be passed to the comptroller so he can plan for the changes. If the squadron underflies a goal and there is a surplus it could be distributed to other squadrons. If there is to be a shortfall the comptroller can try to find or ask for more funds if he knows about it.

5. Group Accounting

Obligations for fuel and maintenance are done by the squadrons with credit cards, requistions or other documents, and open accounts. The obligations are submitted to the group fiscal office where they are consolidated and forwarded to the Fleet Accounting and Disbursing Center (FAADPAC/LANT). FAAD receives the requisitions/charges and

makes all disbursements and expenditures. They compare the obligations and expenditures and draw up a difference listing which shows when obligations and expenditures don't match. Because of the paperwork they are 3-6 months behind which causes a problem at the end of the fiscal year. The group tries to do the accounting on their own so they will have some idea of where they stand and can anticipate any problems.

There are no civilians in a Marine Aircraft Group and the turnover of Marines is high so trying to maintain a level of expertise and consistency is an ongoing problem, especially in a fiscal office where the Marines assigned are aviation supply MOS's and have no accounting background. As a result the fiscal office must have an ongoing training program. This lack of training causes time away from the job to train and causes inconsistencies between MAG's in the way they conduct business.

Even if 3415/3451 accounting personnel were assigned they do not have any blue dollar training or experience and must be trained for the O&M,N accounting.

6. Program Manipulation

One of the reasons the flying hour program is difficult to measure in meaningful and quantifiable terms is its susceptibility to manipulation at the operator level. The same returns can be gained from an over or under funded program. If underfunded, cost savings measures may be

imposed so as to use less fuel and get more flight time for the dollar. Some of these measures include;

- Limit flights to those that do not use as much fuel. High altitude flights, instruments, low burner operations. "Boring holes" - may not provide meaningful training.
- Reprogram hours into lower CPH aircraft such as helicopters or prop driven.
- Schedule more simulator time.
- Use ranges closer to home.
- Limit wasteful flights.

It is a question of balance between operational and fiscal responsibility. Fiscal constraints become overriding and detract from the quality of training. Today's threat requires tactics that may consume high rates of fuel. If tactics cannot be practiced sufficiently in peacetime there may be an affect on combat performance with possible higher casualty rates realized if aircrews are not comfortable with procedures.

If overbudgeted, the money may be spent to buy extra tools and parts to "get well" or stock up for less affluent times. Fuel conservation will not be practiced, flying at high power settings, extending flights, or flying sorties unnecessarily.

The measurement system can be manipulated so it will appear more favorable. FMC/MC status of aircraft is one of

the more widely used indicators of readiness and one of the easiest areas to manipulate. A squadron can make figures say what they want them to while leaving no visible trail to be audited.

Hours don't necessarily equate to readiness. By adding range tanks or throttling back to maximum endurance settings, a squadron can add hours and reduce sorties. As an example a fighter squadron can add three range tanks and fly at max endurance and expand a 1.2 hour sortie into 2.5 hours. However the aircraft are not best utilized at max endurance and for those missions pilots are cheating the system and not getting the training benefit from them.

Other readiness indicators are easily manipulated as the evaluations are subjective. Forecasted operations plans can be made to look good by underestimating sorties to be flown, then adding on sorties during the day. A squadron can get 150-200% of monthly operation plan completion this way.

C. PROGRAM UNDERSTANDING

The flying hour program is complex and difficult to understand. The confusion over PMR has been explained. What the planners in the fleet are expecting to accomplish with the funds and what is expected of them by Congress may be two entirely different things. This can cause problems in funding and future support.

High level Navy personnel may not understand the Marine requirements and not give them the proper support in the budget evolution.

Operators at the group and squadron may not understand the fiscal consequences of their actions. They see hours and the need to fly. When the hours are not budgeted they may not see why or understand the results of flying at higher power settings and using fuel at a faster rate.

The poorer the understanding is of the program the harder it is to sell the requirements of the program and the harder it is to control its execution.

V. ALTERNATIVES

This section presents alternatives to issues raised in section IV. The implementation of the alternatives will not be presented. The alternatives are presented as general suggestions and not delved into with a lot of detail. Many of the alternatives have been under study or are being implemented. As an example POM-88 will present total mission requirements (TMR) as a replacement for PMR.

A. STATING THE REQUIREMENT

1. Primary Mission Readiness

There needs to be a better definition of the FHP requirements. It needs to categorize the other demands on flight time that do not contribute directly to readiness training and is sensitive to OPTEMPO - it needs to be adjustable for the variable costs shown in Figure 4-1.

The system receiving wide support to replace the present one is Total Mission Requirements or TMR. TMR is developed from service support (tasks and commitments), battle ops (operations and exercises), and aircrew training. TMR would then cover;

- These hours would maintain flight crew qualifications in warfare specialty areas.
- Provide necessary fleet operations support.
- Provide other service support.

For the Navy, TMR adjusts with deployment cycles rather than a fleet percentage with PMR. Under PMR a squadron was either overflying while on deployment and underflying during stand down. The hours averaged out, but the PMR criteria did not present a true picture of what was happening. For the Marine Corps it would be easier to justify the requirements, as TMR simply states the requirements without dealing with percentages.

The benefit of the TMR method of computing requirements due to changes in flying tempo is that the changes can be quantified in the terms of hours or dollars, which is essential in equating readiness to resources.

TMR is endorsed by the fleet commanders [Ref. 16] as they recognize that they would get better support with it.

TMR will not measure readiness any more than PMR as it is not designed as a measurement system. It does provide a clear distinction between various parts of the flying hour program, which interact with operational readiness. Actual readiness is not developed from syllabus completion alone. The Center for Naval Analysis [Ref. 16] has shown there is a direct correlation between performance and numbers of hours flown. The problem with selling TMR is that it would be more costly than PMR, and PMR is an accepted definition of readiness by OSD and Congress.

Another proposal that has received support from the Secretary of the Navy [Ref. 17] is to provide a flat 25

hours per month per aircrew. With the exception of patrol and cargo type aircraft the general consensus among aviators is that 25 hours per month is adequate to complete and maintain a high level of readiness.

2. Cost Per Hour

The important issue is communicating the requirement. This problem ties in somewhat with the Marine requirements being merged with the Navy requirements, so the differences of one are lost in the overall picture. When there is a cost change it must be identified early and documented well. Follow up is an important factor. This can be developed with the evolution of a Marine Corps program. When a requirement is submitted the requirement can also be submitted to HQMC where the program representatives can track the requirement through the system.

Another way would be to use a floating CPH. This would allow for differences in types of procedures, climate, terrain, and missions. The problem is that it is open for possible abuse. It does not encourage conservation when appropriate. An externality to operating at higher power settings continuously is that the engines are working harder and there would be higher associated maintenance costs over time in addition to higher fuel costs. If a floating CPH were used it would increase the OP-20 workload substantially.

3. Crew Seat Ratio - Pilot Population

The problem of inaccurate crew seat ratios is a touchy one and may be difficult to correct. There are simply too many pilots for the ratios. The simple solution would be to revalidate the ratios to the actual strength of the squadrons. This would be difficult to sell as the ratios are based on a 90% manning level of the squadron tables of organization (T/O's) and other factors previously explained. To revalidate because of changes in strength would make it, in essence, a floating ratio.

When new aircraft are introduced into the fleet make sure the crew seat ratios are correct. Stress safety and the requirement to train new pilots so that they are not too low. Live with the ratios on aircraft being phased out and make corrections for the future. Work continuously over time pressuring for change bit-by-bit.

There may be some justification for revalidation of some of the ratios, but the main problem lies in the excess pilots and staff pilots drawing down on the total hours available. The excess pilot situation is sensitive and in reality a manpower issue.

The Marine Corps can address the issue and request additional hours to support the extra pilots, slow the inputs into the squadrons and let attrition reduce the numbers, or reassign the extra pilots to non-flying jobs. Slowing down inputs could have a harmful affect on long

range readiness and upset the rank structure within the MOS's.

The T/O's can be changed to incorporate more non-pilots into the squadrons. There are billets, such as maintenance officer and administrative officer, that it might be better to have a ground officer in and available at all times and not off flying. By having more ground officers less pilots will needed to be carried.

The Marine Corps would have a hard time justifying a force structure that calls for extra pilots to be carried. There is no document or program that justifies it, so there is no credibility to the analysts and they look upon it as mismanagement.

The T/O's can be validated so they are accurate for current requirements and have any updates implemented into the OP-20.

4. Staff Hours

The Marine Corps sees the staff pilots as the first line of combat augmentation to squadrons in a wartime situation. They would provide the initial surge to bring a squadron up to 100% (assuming the squadron was at the 90% manning level) of T/O. For this reason planners feel staff pilots should be treated the same as squadron pilots and must be fully combat qualified. They should fly on a regular basis in order to maintain combat proficiency.

There needs to be a standardized method of determining the requirements. The PMR criteria would not fulfill the goals of HQMC. To meet those goals the staff pilot concept should be done away with and they should be funded for the same as squadron pilots. TMR could easily incorporate the change.

Another way would be to maintain the same 100 hour requirement but change the model used in the OP-20 so that the staff are funded at 100% and not 85%.

The number of staff pilots could be fenced at a level that reduces the impact of the squadrons. The squadrons for the most part look on staff pilots as an evil that must be tolerated and would support reductions in staff flying.

Greater usage of simulators, where available, by staff pilots would reduce the impact on squadron hours.

5. Simulators

The Marine Corps can follow several possible courses of action to improve the position of flight simulator usage.

- Revise the FHP to incorporate an increased use of flight simulators with a goal of 2% of PMR. This would require procurement of simulators to make them available to more communities at more air stations.
- Have staff pilots utilize simulators more. This would reduce the impact they have on squadron operations and help raise the usage rate.
- Make sure the stated usage is correct. Franklin [Ref. 14:p. 46] reported that FMFLANT was understating the simulator contribution while FMFPAC was overstating it. By incorporating a recommended [Ref. 14:pp. 59-60] five

year plan that revised the FHP simulator usage the contribution would be correctly stated although would still fall below the 2% rate.

- Whether Franklin's plan is followed or if the program is left in its current state the Marine Corps must make a well stated justification to the decision makers or continue to take criticism and potential cuts as in the POM-87.

6. Navy-Marine Corps Differences

Using total mission requirements would correct some of the differences between the Navy and Marine Corps as it would recognize total requirements and be more sensitive to changes or differences in operating tempo.

It would be a good idea to continue to develope a unified Marine Corps flying hour program and supporting Marine Corps requirements from a higher level would give the Marine peculiar requirements a better chance of surviving through NAVCOMPT, OSD, and Congress.

Communication is the most important ingredient in overcoming any differences. One of the reasons given for marks to budget requests is that there was insufficient justification or there was no indicated differences between the two programs. FMFPAC and FMFLANT should be in agreement over issues so as to present a united front. HQMC should be involved in the process to assist when necessary.

The Marine Corps status in the OPTEMPO report needs to be stated in Marine Corps terms or it may eventually cause some problems if it becomes a standard of budget execution. It appears as if shore based units are taking hours from at

sea units and if there is an attempt to correct the situation the Marine program may suffer.

7. Training

The real training load should be identified, including the overhead hours. Numbers are being manipulated at the expense of training. Align the categories of types of training with the Navy. For example the Navy does not have a Instructor Under Training (IUT) category. This would the reduce additional problem of Navy-Marine Corps differences that make the understanding of the program that much more difficult.

8. USMC Policy

Although the Marine Corps is working towards this end it is important to the FHP that it succeed. The program is the programs of the two FMF's and not a central Marine Corp program. It doesn't need to be a central policy; however the FMF's should standardize and unite as much as possible. There will be some areas where they can maintain an independent stand. The stronger front with the support of HQMC can go a long way to get the requirements correctly stated and understood.

B. PROGRAM MANAGEMENT

1. Budgeting Priorities

To ensure a fully combat ready aviation arm of the Marine Air-Ground Team the flying hour program must have the fullest support from the highest levels.

2. Fiscal Chain

One considerations would be to have the Marine Corps totally manage the FHP by incorporating it into the O&M,MC appropriation. This would overcome many of the difficulties from being in the O&M,N chain and give the Marine Corps control of their own program, but it would create a number of new problems, aside from being impossible to sell and implement.

- As the CinC's are operational commanders to the FMF's they need assurance the funds are there to support operational commitments which they can do best by controlling them.
- The Navy owns, funds and controls all the aircraft and all other aviation assets and would not relinquish control of the operating funds.
- Congress has a difficult enough time trying to understand three different services' flying hour programs and would not be too receptive to a fourth.

Making the FMF commanders OPBUD holders in the present system would work better. The flow of spending authority should follow the operational chain by giving the immediate superior the "power of the purse" over subordinate organizations. As was seen by figures 2-1 and 2-3 the operational and fiscal chains are different. By making the

FMF commander an OPBUD holder he would be directly responsible to the CinC, who is the major claimant.

The FMF has the expertise because they already do all the functions of an OPBUD holder without the responsibility. It would give the FMF commander more flexibility in his program and the opportunity to run it more efficiently.

This change would definitely help FMFPAC as the geographic (FMFPAC - Hawaii and COMNAVAIRPAC - San Diego) separation now slows down the process somewhat. CinCPACFLT is also located in Hawaii.

One drawback would be that the money would be limited. Now if there is a shortfall or unfunded requirement the FMF commander can go to the OPBUD holder and request more funds. Since CNAL and CNAP control much larger budgets than the FMF alone would there is more likely a chance the extra funds will be available.

3. Unit Deployment Crossfunding

TMR would cover the problem of more expensive operations for a deployed unit from FMFLANT to WESTPAC. As it now stands funding is based on OP-20 funding for Lant requirements and costs which are not adequate for deployed operations where the CPH is higher. Without TMR it would be a need to address the problem in OP-20 planning.

The problem of CAG's flying a squadron in excess of planned hours a greater problem in the Pacific Fleet than in the Atlantic Fleet. In the Pacific Fleet if the CAG

exceeds planned flying hours the squadron or MAG must cover the excess at the expense of other squadrons or future operations, or the squadron might request additional funding from FMFPAC. FMFPAC, not holding any funds, in turn asks CNAP or requests to reprogram funds in house. In the Atlantic if the CAG exceeds planned hours he can go to directly to CNAL and request more money. CNAL passes the funds to FMFLANT who in turn passes it on to the squadron. This is a better better procedure because CNAL has better control over the CAG's this way, and other Marine squadrons aren't impacted.

4. Communications

It is important that the operators be aware of the fiscal consequences of their actions and communicate changes to the wing comptrollers. Fiscal managers should make efforts to ensure squadron commanders are kept informed and the commanders operate in a responsible manner.

5. Group Accounting

Some of the aviation supply MOS billets in the MAG fiscal office could be augmented or replaced by 3415; Financial Management Officer and 3451; Accounting Technician. The impact would be the large number of 3415/3451's required and it would take time to implement. The trade off is that not as so many aviation supply personnel would be needed.

Expand the current formal training program to include some accounting and some familiarization with blue dollar accounting.

6. Program Manipulation

The temptation to manipulate hours or reports would not be so great if squadrons were funded to the requirement - another argument in favor of TMR. Burton [Ref. 18] recommends holding squadron commanders more accountable by linking budget execution with performance reports because an evaluation of resource management would provide incentive for the squadron commander to review and validate CPH information and fuel consumption.

However, a squadron commander should be left to do what he is tasked to - prepare his squadron to carry out the assigned mission. He is an operator and should be given the opportunity to operate. He should be aware of the link between dollars and hours and should know how the resources can work for or restrict him but he should not have it hanging over his head.

A financial management course should be included in AWS and Command and Staff College. This would better prepare future commanders for their roles as resource managers in an increasingly tighter fiscal atmosphere.

C. PROGRAM UNDERSTANDING

Replacing PMR with TMR would go a long way in helping Congress and OSD understand the DON flying hour program. There would be an initial resistance to change and problems in having to indoctrinate a new program. In the long run it would pay off as TMR states what is needed and the false indications of PMR would be gone. As stated earlier many consider PMR to be a measure of readiness when it is just a statement of training requirements.

Another step would be to expand on the Force Readiness Report (FRR) that's made annually to Congress. There is no link between resource inputs and expected readiness outcomes. Although there are no single reports that measure readiness there are some that could be used to help Congress understand the affect of funding on force readiness.

Include financial management into formal schools to get knowledge to the fleet. As a part of the flying hour program, program managers could carry the gospel to the field in the form of pilot training. If every pilot were aware of the funding procedures and policies he might be encouraged to utilize flight time more productively.

VI. CONCLUSIONS

When the Marine Corps was able to fully execute the budgeted flying hours in the early 1980's the FMF's designated flying hour program managers to coordinate the program. During the following years the program has grown and has accomplished a lot. During the course of this study it became apparent that there is more to be accomplished with the flying hour program, and the independent FMF programs that have been developed will evolve into a united Marine Corps program.

The program is underfunded for the Marine Corps to meet its desired level of readiness and to conduct non-training missions. Simply raising the investment in the program will not necessarily meet those ends and there is not an adequate method of accurately measuring the return on the dollar. The program must be made more efficient from within to make it more effective.

The program methodology for determining the requirements is outdated and confusing. Using total mission requirements instead of primary mission readiness is a big step in the right direction. The Marine Corps needs to ensure the requirements are stated correctly and well justified. If the justification and methodology accurately state the needs the overall funding requirements will be

greater. It will then be up to the decision makers to decide on funding the program.

Changing the funds flow to follow the operational chain of command and giving the FMF commander the responsibility for his budget will improve the efficiency of the execution. The improved flexibility should be recognized in increased readiness.

Communication is the key to a well run program. Communicating the need for a responsibly executed program to the fleet gets the operators involved in the program. However the squadrons should be funded at a level so they are free to work towards their goals and not be so fiscally constrained that readiness suffers or they try to beat the system. The decision makers in Congress, OSD, and SECNAV must understand the Marine Corps peculiar requirements in order to give them favorable support. This can be worked toward through a united and well run program.

APPENDIX A

TABLE A: O&M,N Authorizations FY82-87 (in millions)

FY82	FY83	FY84	FY85	FY86	FY87
$19,581.697	$20,880.928	$22,292.928	$25,334.7	$25,072.5	$25,688.5

TABLE B: OP-20 FY86 and FY87 Flying Hour Program (data from OP-20 rpt of 4 Oct 1985)

		HRS REQ	HRS BUDGET	PMR %	CPH	(millions) $ REQ	$ BUD	FORCES
FMFLANT	FY86	150,644	128,422	85.25	1825	275.889	234.414	374.5
TACAIR	FY87	162,764	139,523	85.72	1877	308.509	261.906	379
FMFPAC	FY86	214,175	178,423	83.31	1743	368.920	311.049	529
TACAIR	FY87	215,274	183,198	85.10	1596	345.074	292.469	529
TOT USMC	FY86	364,819	306,845	84.11	1770	644.809	545.403	903.5
TACAIR	FY87	378,038	322,721	85.37	1718	653.583	554.374	908
USN/USMC	FY86	1,094,688	934,752	85.39	1932	2095.226	1805.842	2289
TACAIR	FY87	1,140,824	974,424	85.41	1841	2093.353	1793.926	2352.5
OVERALL	FY86	2,442,353	2,204,204	90.25	1469	3620.505	3237.287	4921
USN/USMC	FY87	2,535,800	2,308,172	91.02	1431	3680.457	3302.881	5011

TABLE C: TACAIR Hours actual(reported) or planned FY81-FY87

	FY81 ACTUAL	FY82 ACTUAL	FY83 ACTUAL	FY84 ACTUAL	FY85 APPR	FY86 BUDGET	FY87 POM
MARINE	259,864	254,429	253,249	285,309	288,156	306,845	322,721
NAVY	591,272	583,248	579,516	591,770	610,364	627,907	651,703
	851,136	837,677	833,665	877,079	898,520	934,752	974,424

TABLE D: Primary Mission Readiness (PMR) in percentage of PMR required.

	FY 1981 ACTUAL			FY 1982 ACTUAL			FY 1983 ACTUAL			FY 1984 ACTUAL		
	NAVY	MARINE	DON	NAVY	MARINE	DON	NAVY	MARINE	DON	NAVY	MARINE	DON
AIRCRAFT	89	74	84	86.8	71.7	81.1	85.9	72.5	81.3	83.5	80.8	82.6
SIMULATORS	2	1	2	2.5	.9	2.0	2.6	.9	2.0	2.5	.9	2.0
TOTAL	91	75	86	89.3	72.6	83.1	88.5	73.4	83.3	84.0	81.7	84.6

	FY 1985 ESTIMATE			FY 1986 ESTIMATE			FY 1987 POM		
	NAVY	MARINE	DON	NAVY	MARINE	DON	NAVY	MARINE	DON
AIRCRAFT	85.3	81.2	84.0	86.0	84.2	85.4	85.6	85.5	85.6
SIMULATORS	2.4	0.9	1.9	2.3	1.0	1.9	2.2	1.0	1.7
TOTAL	87.7	82.1	85.9	88.3	85.2	87.3	87.8	86.5	87.3

TABLE E: O&M,N funding schedule FY 84-FY87 (dollars in millions/hours in thousands)

	FY 1984	FY 1985	FY 1986	POM-87	
TOTAL	$1,585.7	$2,371.6	$3,019.6	$3,320.5	
FUEL	971.5	907.8	829.4	913.6	
CONSUMABLES	614.2	707.1	750.0	804.2	
AVDLRS	-0-	756.1*	1,440.2	1,602.7	* ½ year
FLYING HOURS	1,818.3	1,851.5	1,970.9	2,088.3	

AVDLRS - Aviation Depot Level Repairables. Came out of stock fund until mid-year FY85.

APPENDIX B

THE OP-20 AND FLYING HOUR INPUT STRUCTURE

A. The OP-20:

The Operations Plan 20 or OP-20 is the basic report of the flying hour projection system. Coming from OSD in the mid 70's the OP-20 is now put together by the Navy/Marine Corps Flying Hour Program Coordinator (NOP-51C) under the Deputy Chief of Naval Operations (Air Warfare), OP-05, who is also the Resource Sponsor for aviation funding. Developed from the analysis of historical data and projected requirements submitted by Navy and Marine Corps units, it provides commanders with guidance concerning annual authorized number of flight hours that may be flown by each type/model/series (T/M/S) aircraft, and it provides the dollar amount to be budgeted for each aircraft flight hour by T/M/S along with the dollar totals for the fiscal year. It is published three times a year;

- May; POM outyear controls. This gives commanders an opportunity to respond with inputs if they feel the requirements do not reflect their actual requirements.
- Sep/Oct; OSD FY Final funding schedule for the Budget Year.
- Jan/Feb; History Final for the completed Fiscal Year

The OP-20 is broken down into "Schedules" or primary missions. Those schedules are:

- Schedule A - TACAIR/ASW; Currently funded at 85% of primary mission requirements.

- Schedule B - Fleet air training; Fleet Readiness Squadrons (FRS). Requirements are generated by a fixed training syllabus generated by the Aviation Manpower & Training Division and funded at 100%.

- Schedule C - Fleet air support, strategic air, environmental prediction(weather);those aicraft that provide support so aircrews can stay operational.

- Schedule D - Reserves, CNET, Recruiting, NAVEUR.

B. POM Submission:

The POM OP-20 is presented to the Resouce Sponsor, OP-05 for aviation, where the OP-20 is balanced against fleet proposals and the Defense Guidance. If requirements are too much OP-05 decides where to make cuts. OP-05 puts together the budget proposal and submits it to the Appropriation Sponsor, the Program Planning Office (OP-90), where all the POM's are evaluated to see they comply with the Defense Guidance, the programs have justification, and are defendable to OSD. From there the POM is sent to OSD where it goes through analysis. After the analysis, the Secretary of Defense holds a series of budget hearings jointly with the Office of Management and Budget (OMB) on the requests. These hearings are used by SECDEF to formulate his Program Budget Decisions (PBD's). The services can make comments that can be used by OSD to revise the PBD's. The budget estimate is finalized and is

submitted to OMB for incorporation into the President's budget.

C. How OP-20 can be used by commanders:

The OP-20 defines a maximum number of flight hours to be flown by T/M/S. The FMF commander ultimately decides on the hours to be flown in view of mission requirements. The Wing G-3 is responsible for total wing flight operations, and provides the group commanders with flying hour ceilings that reflect wing operational goals and objectives.

For the operational commander it is a question of balance between dollars and operations. Usually operators feel they can fly more than budgeted so they must compare the allocations with their own plans and adjust accordingly. There are often several courses a commander can pursue.

- Fly as they have planned, requesting additional funds later on, and fly to their own target. Here they risk having to shut down flight operations early if suplemental funding does not come about. This occurred to the 3rd MAW at the end of FY85.

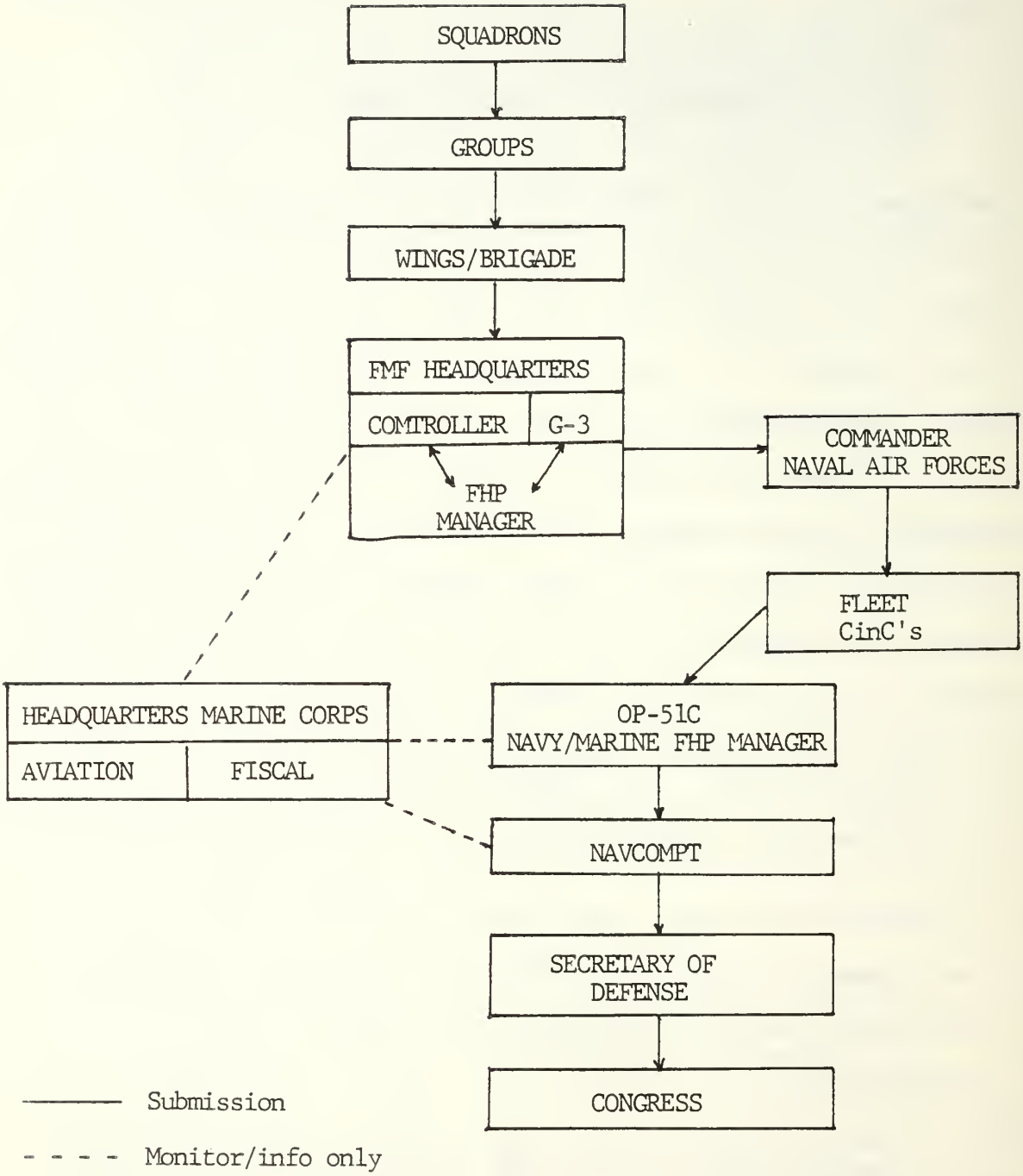
- Fly at a reduced pace and stay within the budget.

- Trade off between T/M/S - let the cheaper to operate aircraft fly more hours at the expense of more expensive high performance aircraft. There is a risk of a reduction of expertise in the high performance aircraft.

- Change the type of flying. Restrict operations that consume high rates of fuel so as to reduce the cost per hour. This risks not getting maximum utilization of training time.

- Use the budget as a standard by which to operate. This would be considered fiscally sound but it detracts from the total commitment to operations.

TACAIR FHP INPUTS



HOURS COMPUTATIONS - TACAIR

1. NUMBER OF AVERAGE AIRCRAFT* X CREW SEAT RATIO = NUMBER OF CREWS
2. NUMBER OF CREWS X HOURS/CREW/MONTH X 12 = PRIMARY MISSION HOURS
3. STAFF HOURS/# OF AVERAGE AIRCRAFT X # OF AVERAGE AIRCRAFT = STAFF HOURS
4. PRIMARY MISSION HRS + STAFF HOURS = REQUIRED HOURS
5. REQUIRED HOURS X PMR MASTER** = (BUDGETED HRS + PAY BACK SIMULATOR)
6. (BUDGETED HRS + PAY BACK SIMULATOR)'- PAY BACK SIMULATOR = BUDGETED HOURS

* Projected average over a two year period, by T/M/S.

** The CNO percentage. For TACAIR it is 85% - 87%.

' Pay Back Simulator is a cost avoidance offset for simulator usuage. The simulator usuage is a percentage of the overall flying hours and the hours calculated at step 5 are reduced by that amount.

EXAMPLE OF TACAIR COMPUTATION

NUMBER AIRCRAFT	CREW SEAT RATIO	NUMBER CREWS	CREW HOURS	PRIMARY MISSION HOURS	OFFSET SIMULATOR HOURS	STAFF HOURS	REQUIRED HOURS
30	1.25	37.5	25	11,250	711	600	11,850

REQUIRED HOURS	X	PMR MASTER	=	GROSS BUDGET HOURS	-	OFFSET SIMULATOR HOURS	=	BUDGET HOURS
11,850		.88		10,428		711		9,717

9,717 = 82%
711 = 6%*
10,428 = 88% PMR

*This is an example. Simulator contribution to PMR does not exceed 2.35%.

DOLLAR COMPUTATIONS

1. CONSOLIDATED $/BBL = (OSD$/JP4 X FC%) + (OSD$/JP5 X FC%)

2. HOURLY FUEL COSTS = CONSOLIDATED $/BBL X HOURLY FUEL CONSUMPTION RATE BY T/M/S

3. HOURLY OTHER COSTS(PRESENT YEAR) = HOURLY OTHER COSTS (PREVIOUS YEAR) X ESCALATION % (PRESENT YEAR)

4. COST/HR = HOURLY FUEL COSTS + HOURLY OTHER COSTS + DLR COSTS/HR

5. TOTAL COSTS REQUIRED = REQUIRED HOURS X COST/HR

6. TOTAL COSTS BUDGETED = BUDGETED HOURS X COST/HR

$/BBL - Price per barrel of fuel

BBL - Barrel of fuel

OSD$ - OSD supplied price of a particular grade of jet fuel; either JP4 or 5

FC% - Funding Category percentage of use for the grade of fuel. For FY86 computations it was 14% for JP4 and 86% for JP5.

DLR - Depot level repairables

APPENDIX C

MARINE CORPS INDICATORS OF AVIATION READINESS

A. EVALUATIONS:

Marine Corps Combat Readiness Evaluation System (MCCRES); Applies to both air and ground units for team and unit training. Used to develope training programs and combat training and is a basis to evaluat unit proficiency. Deployable units are evaluated every 18 months, others every 24 months.

After Action Reports; Used as evaluation aids to highlight strengths and weaknesses when particpating in training exercises. The Marine Corps Air-Ground Combat Center at Twenty Nine Palms is used to conduct combined arms training which is evaluated against MCCRES performance statdards.

B. TRAINING STANDARDS AND GOALS:

NAVAL AIR TRAINING AND OPERATING PROCEDURES (NATOPS); Annual Navy evaluations of individual and unit compliance with NATOPS. Evaluate individual Navy and Marine pilot, flight officer or crewmember. Determines whether or not a pilot a pilot is qualified, conditionally qualified, or unqualified. Provide objective look at strengths and weaknesses of training program.

Marine Corps Aviation Training and Readiness Manual; Standardizes aviation training and specifies flight qualification performance requirements for aircrews by type/model aircraft. Prescribes the number of sorties and tasks to be accomplisged, and maximum amount of time between flights before demonstrated proficiency is expected to degrade (currency). Defines the Primary Mission Readiness areas. The percentage of completion of the prescribed syllabus is the basic information by which the Flying Hour Program is funded.

Fully Combat Qualified - 100% of training complete and current
Combat Capable - 60% of training complete

C. MANAGEMENT INFORMATION SYSTEMS AND PROJECT INITIATIVES:

Aviation Training and Readiness Information System (ATRIMS); A Marine Corps unique special purpose training management

tool designed and developed specifically for the aircrew training manager in aviation units. ATRIMS is a limited use system that utilizes T&R standards and inputs from FREDS and other data as desired to provide the squadron/detachment commander with the following capabilities:

- uses existing data to update flight training requirements.
- provides forecasts for training requirements.
- assists in daily scheduling of individual flight and ground training.
- assists in meeting daily flight currency and proficiency objectives.
- assists in verifying performance standards.
- provide data for reporting Combat Readiness Percentage (CRP) to higher command.

Flight Readiness Evaluation Data System (FREDS); The Marine Corps' basic aviation combat readiness reporting system. it is a Marine Corps unique automated data system designed to collect flight activity data on aircraft and crews. It is used to analyze and report flight activity to all levels of command from squadrons to HQMC staff agencies. It provides commands with the capability of mainitaining complete records on individual aircrewmen and aircraft by type/model/series. Commanders use it to develope readiness assesment of pilots, crews, and units. FREDS is interfaced the T&R Manual to provide task accomplishment data from which the combat readiness percentage (CRP) is determined.

APPENDIX D

PILOT POPULATION DATA

FY-83 PILOT STATUS REPORT AS OF 30 SEP 83

	TOTAL			LTCOL			MAJOR			CAPT			LIEUT		
	REQ	O/B	+/-	REQ	O/B	+/-	REQ	O/B	+/-	REQ	O/B	+/-	REQ	O/B	+/-
F/W SUBTOT	1493	1463	-30	166	278	+112	341	456	+115	478	530	+52	508	199	-309
INDIV	258	328		7	0		14	0		33	35		204	293	
F/W TOTAL	1751	1791	+40	173	278	+105	355	456	+101	511	565	+54	712	492	-220
R/W SUBTOT	1909	2072	+163	175	206	+31	399	474	+75	587	847	+260	748	545	-203
INDIV	260	144		7	0		16	0		27	5		210	139	
R/W TOTAL	2169	2216	+47	182	206	+24	415	474	+59	614	852	+238	958	684	-274
TOTAL PILOT	3920	4007	+87	355	484	+129	770	930	+160	1125	1417	+292	1670	1176	-494

PROJECTED PILOT INVENTORY VS REQUIREMENTS

(NO ADJUSTMENT TO PTR FY84 THROUGH FY90)

FISCAL YEAR	83	84	85	86	87	88	89	90
TOTAL GAINS(PTR)	441	480	500	500	500	500	500	500
TOTAL LOSSES	186	362	470	474	477	479	482	484
(attrition rate)	.0488	.0890	.1125	.1125	.1125	.1125	.1125	.1125
NET GAIN/LOSS	+255	+118	+30	+26	+23	+21	+18	+16
REQUIREMENT	3920	3928	3996	4050	4044	4085	4106	4249
BEGIN FY INVENT	3807	4062	4181	4210	4237	4260	4281	4299
BEGIN FY DELTA	-113	+134	+185	+160	+193	+175	+175	+50

APPENDIX E

GLOSSARY

ADMINISTERING OFFICE; The Headquarters Command which is responsible for budgeting, accounting, reporting, and controlling obligations and assigned expenditures for programs financed under an appropriation or subdivision of an appropriation. Also referred to as Claimant/Subclaimant.

AIRCRAFT PROGRAM DATA FILE (APDF); A secret programming document published three times per year by OP-508, and is used by the Aviation Supply Office to determine the number of spare parts needed to support the number of aircraft programmed into the fleet. The number of spares is determined by projected hours, not just aircraft totals.

ALLOCATION; An authorization by a designated official of a component of the Department of Defense making funds available within a prescribed amount to an operating agency for the purpose of making allotments.

APPROPRIATION; An act of Congress that allows federal agencies to incur obligations and make payments from the Treasury for specified purposes.

AVIATION DEPOT LEVEL REPAIRABLES (AVDLR's); Also referred to as DLR's, they are the replenishment spare parts to support the fleet aircraft. Until April 1985 new spares were purchased from the procurement appropriation and repairable items were reworked by the depot maintenance activities and financed by the O&M,N account, but not charged against the Flight Hour Program. Free issues of these spares were made to the operating commands. Under the current system begun in April 1985 aviation commands purchase replenishment parts, new and rebuilt, from the stock fund using funds budgeted for in the OFC 50 budget.

BUDGET; A document which expresses in financial and descriptive terms a plan for accomplishing an organization's objectives during a specific period of time. It is an instrument of planning, decision-making and management control. The budget is also and instrument of fiscal policy and a statement of national priorities.

BUDGET AUTHORITY; Authority provided by law to enter into obligations which generally result in immediate or future outlays of Government funds.

COMBAT READINESS PERCENTAGE (CRP); The percentage of a specific tactical aircraft flight sylabus in which aeronautically designated personnel (ADP) are proficient. Proficiency is a measure of achievement of a specific skill by actual demonstraion of that skill as established by the Marine Corps T&R Manual for each type/model aircraft. CRP's have been divided into four basic categories based on the total percentage of proficiency ADP's have demonstrated within their respective syllabi as shown below:

Combat Capable	- 60 percent CRP
Combat Ready	- 70 percent CRP
Combat Qualified	- 85 percent CRP
Full-Combat Qualified	- 100 percent CRP

COST CENTER; A subdivision of a field activity or a responsibility center. It is an organizational entity for which identification of costs is desired and which is amenable to cost control through one responsible supervisor. For O&M,MC allocations it is called a Planning Estimate Holder and is the smallest entity within the FMF OPBUD which exercises direct financial management responsibility.

CREW SEAT RATIO; The relationship of how many pilots are assigned to fly and takes into account those events such as leave, sickness and injury.

EXPENDITURE; A charge against available funds. It is evidenced by voucher, claim, or other document approved by competent authority. Expenditure represents the actual payment of funds.

EXECUTION; The operation of carrying out a program as contained in approved budget. Often referred to as "Budget Execution".

FULL MISSION CAPABLE (FMC); Hours which an aircraft has all of its associated systems fully operational and capable of performing all assigned missions. Calculated as a percentage of the total hours available in a month and aggragated for the entire squadron of aircraft.

FISCAL YEAR (FY); Accounting period beginning 1 October and ending 30 September of the following year. The fiscal year is designated by the calendar year in which it ends. The Fiscal Year 1987 begins on 1 October 1986 and ends on 30 September 1987.

FIVE YEAR DEFENSE PROGRAM (FYDP); The Five-Year Defense Program summarizes all approved programs of the entire Department of Defense. Resources or inputs required for

five years are combined with military outputs or programs for the same period. The FYDP is expressed in terms of programs, program elements and resource catagories.

FORCE STRUCTURE; The number of aircraft assigned to individual units. Fixed by the Aircraft Procurement Plan (APP).

MAJOR CLAIMANT/SUBCLAIMANT; A major claimant is a bureau/office/command/Headquarters, Marine Corps which is designated as an administering office under the Operation and Maintenance appropriations in NAVCOMPT Manual, Volume 2, Chapter 2. Subclaimants are bureaus/offices/commands designated as administering offices which receive a subclaimant operating budget from a major claimant.

MISSION CAPABLE(MC); Hours in which an aircraft is capable of performing at least one of its assigned missions. Calculated as a percentage of the total hours available in a month and aggragated for the entire squadron of aircraft.

OBLIGATION; A duty to make a future payment of money. The duty is incurred as soon as an order is placed. It is not necessary that goods actually be delivered, or services actually be performed, before the obligation is created; neither is it necessary that a bill, or invoice, be received first. The placement of an order is sufficient. An obligation legally encumbers a specified sum of money which will require outlay(s) or expenditure(s) in the future.

OP-20; Operations Plan 20. A DON planning document published by the Navy/Marine Corps Flying Hour Program Coordinator (NOP-51C) several times a year to establish the annual flying hours by T/M/S, and is used for FHP funding and fleet planning. Requirements are computed by using historical data and revised with Fleet inputs. The OP-20 shows; required hours computed from factors of Primary Mission Readiness(PMR) requirements, crew seat ratios, force structure, and staff hours; budgeted hours computed as a percentage of PMR; cost per hour by T/M/S; total costs by budget line item; and total costs

OPERATING TARGETS (OPTARs); An estimate of the amount of money which will be required by an operating ship, staff, squadron, or other unit to perform the tasks and functions assigned. Commanding officers may give subordinates a degree of financial responsibility paralleling their other responsibilities by the administrative procedure of issuing operating targets (OPTARs) for funds that are planned for utilazation by the subordinate commander. OPTARs are administrative limitations and not legal subdivisions of

funds, and the issuing commander retains all legal and accounting responsibility.

OUTLAYS; Checks issued, interest accrued on the public debt, or other payments, net of refunds and reimbursements. Total budget outlays consist of the sum of the outlays from appropriations and funds in the budget, less receipts.

PLANNING ESTIMATE HOLDER; A cost center in the FMF for managing O&M,MC funds.

PRIMARY MISSION READINESS (PMR); Those hours required to maintain the average flight crew qualified and current to perform the primary mission of the assigned aircraft; to include all weather/day/night carrier operations as appropriate.

PROGRAM OBJECTIVES MEMORANDUM (POM); A memorandum in prescribed format submitted to the Secretary of Defense by the Secretary of a Military Department which recommends the total resource requirements within the parameters of the Secretary of Defense fiscal guidance.

RAMP-UP; Accelerating a program such as the Flight Hour Program to achieve overall objectives. As an example FMFPAC moved 25% of 4th quarter funds to the first three quarters so as to fly to the operational objectives.

RESOURCES; Resources consist of military and civilian personnel, material on hand and on order, and the entitlement to procure or use material, utilities, and services.

RESPONSIBILITY CENTER; An organization unit headed by an an officer who is responsible for the management of resources in the unit, and who in most instances, can significantly influence the expenses incurred in the unit. The lowest level holding legal and accounting responsibility under Section 1517 - the Operating Budget Holder. COMNAVAIRPAC and COMNAVAIRLANT are the Responsible Centers for O&M,N Operating Budgets. FMFPAC/LANT are the Responsible Centers for O&M,MC Operating Budgets.

RESPONSIBLE OFFICE; The Headquarters Command which is responsible for budgeting, accounting and reporting the totality of an appropriation. CNO is the responsible office for the O&M,N Approriation.

STEAMING DAYS; Number of days a ship is cruising with its main engines running. Used as a measure of resource consumption.

SUBORDINATE COMMAND; In the FMF it is one of the major elements of the FMF such as a wing, division, or FSSG.

SUPPORT TAIL; The spare parts in the supply system required to sustain a given tempo of flight operations so aircraft are not grounded due to a spare part not being available.

TYPE/MODEL/SERIES (TMS); The specific designation of aircraft used by the military and used by the DON flight hour program for planning and funding. Type refers to the mission of the aircraft such as attack (A), fighter (F), etc.. Model refers to the particular airframe in that mission category such as an A-4 or F-4. The series is a particular configuration within the model such as an A-4E or A-4M, or an F-4N or F-4S. The series indicates equipment that is installed on board that gives it individual mission or performance capabilities. In most cases the higher the letter designator - the newer the series. This is not always true such as in the case of the CH-46E which followed the CH-46F series.

UNITREP; Unit Status and Identity Report. A management information system used by the JCS to monitor status of military units. Units report in terms of combat readiness ratings C-1 to C-5 designed to measure the units ability to perform its wartime tasks by assissing the peacetime availability and status of resources possessed or controlled by the unit in the four resource areas of personnel, equipment and supplies on hand, equipment condition, and training. The C-ratings are;

C-1	fully combat ready
C-2	substantially combat ready
C-3	marginally combat ready
C-4	not combat ready
C-5	service programmed not combat ready

WEAPON SYSTEM PLANNING DOCUMENT (WSPD); A confidentail document published by NAVAIR on an irregular schedule every 12-18 months. It shows the aircraft procurement and delivery schedule and the distribution of those aircraft. It used by ASO to determine the time and location of needed spares.

APPENDIX F

GLOSSARY OF ACRONYMS

AAA	AUTHORIZATION ACCOUNTING ACTIVITY
ADCON	ADMINISTRATIVE COMMAND
AFM	AVIATION FLEET MAINTENANCE
APDF	AIRCRAFT PROGRAM DATA FILE
APF	ANNUAL PLANNING FIGURE
ASO	AVIATION SUPPLY OFFICE
BOR	BUDGET OPTAR REPORT
CinC	COMMANDER IN CHIEF
CMC	COMMANDANT OF THE MARINE CORPS
CNAL or COMNAVAIRLANT	COMMANDER, NAVAL AIR FORCES, U.S. ATLANTIC FLEET
CNAP or COMNAVAIRPAC	COMMANDER, NAVAL AIR FORCES, U.S. PACIFIC FLEET
CNO	CHIEF OF NAVAL OPERATIONS
CPH	COST PER HOUR
CRP	COMBAT READINESS PERCENTAGE
CSR	CREW SEAT RATIO
DF	DIRECT FUND
DLR	DEPOT LEVEL REPAIRABLE
DOD	DEPARTMENT OF DEFENSE
DON	DEPARTMENT OF THE NAVY
FAADCPAC/LANT	FLEET ACCOUNTING AND DISBURSING CENTER, PACIFIC OR ATLANTIC
1st MARBDE	FIRST MARINE BRIGADE
FHCR	FLYING HOUR COST REPORT

FHP	FLYING HOUR PROGRAM
FMC	FULL MISSION CAPABLE
FMFLANT	FLEET MARINE FORCE, ATLANTIC
FMFPAC	FLEET MARINE FORCE, PACIFIC
FREDS	FLIGHT READINESS EVALUATION SYSTEM
FRS	FLEET READINESS SQUADRON
FRR	FORCE READINESS REPORT
FY	FISCAL YEAR
FYDP	FIVE YEAR DEFENSE PLAN
FYTD	FISCAL YEAR TO DATE
GAO	GENERAL ACCOUNTING OFFICE
JCS	JOINT CHIEFS OF STAFF
MAG	MARINE AIR GROUP
MAW	MARINE AIR WING
MC	MISSION CAPABLE
MCCRES	MARINE CORPS READINESS EVALUATION SYSTEM
NATOPS	NAVAL AIR TRAINING AND OPERATING PROCEDURES
NAVCOMPT	COMPTROLLER OF THE NAVY
OFC	OPTAR FUNCTIONAL CATEGORIES
O&M, MC	OPERATIONS AND MAINTENANCE, MARINE CORPS
O&M, N	OPERATIONS AND MAINTENANCE, NAVY
OP-20	OPERATING PLAN 20
OPCON	OPERATIONAL CONTROL
OPTAR	OPERATING TARGET

OPTEMPO	OPERATING TEMPO
OSD	OFFICE OF THE SECRETARY OF DEFENSE
PAA	PRIMARY AIRCRAFT AUTHORIZATION
PMA	PRIMARY MISSION AREA
PMR	PRIMARY MISSION REQUIREMENT
POL	PETROLEUM, OIL AND LUBRICANTS
POM	PROGRAM OBJECTIVE MEMORANDUM
PPBS	PLANNING, PROGRAMMING AND BUDGETING SYSTEM
SECDEF	SECRETARY OF DEFENSE
SECNAV	SECRETARY OF THE NAVY
TAAI	TOTAL AIRCRAFT AUTHORIZED INVENTORY
TACAIR	TACTICAL AIR
T/M/S	TYPE/MODEL/SERIES
TMS	TOTAL MISSION REQUIREMENT
TYCOM	TYPE COMMANDER
UDP	UNIT DEPLOYMENT PROGRAM
UNITREP	UNIT STATUS AND IDENTITY REPORT
WSPD	WEAPON SYSTEM PLANNING DOCUMENT

LIST OF REFERENCES

1. Department of the Navy, Chief of Naval Operations, Strategic Concepts of the U.S. Navy, NWP 1 (Rev A), Chap 4, 1978.

2. U.S. General Accounting Office report GAO/NSIAD-85-75, Measures of Military Capability: A Discussion of Their Merits, Limitations, and Interrelationships. June 13, 1985.

3. U.S. General Accounting Office report GAO/NSIAD-86-94, How DoD evaluates the Effect of Unit Training, May, 1986.

4. Department of the Navy, Headquarters U.S. Marine Corps, Marine Corps Manual, 1980.

5. Department of the Navy, Headquarters U.S. Marine Corps, FMFM 5-1, Marine Aviation, Washington, D.C., 1979.

6. CGFMFPAC msg 100207Z AUG 84. Subj: DON review adjustments to TACAIR Flying Hour Program.

7. Smith, Keith A., LtGen, USMC. "On Land, Sea, and in the Air - Marine Aviation FY-87 Posture Statement." Marine Corps Gazette, May 1986, pp. 69-70.

8. Interview with Greg Barber, NAVCOMPT BA-1 Analyst, 19 August 1985.

9. Commanding General, Fleet Marine Force Pacific, letter 7100; Ser 12/843173 of 6 Nov 84, "Flying Hour Requirements for POM FY87".

10. Department of the Navy Instruction 3710.7L, "NATOPS General Flight and Operating Instructions", 24 Sep 1984.

11. U.S. Marine Corps Flying Hour Conference, Headquarters Marine Corps, October 28, 1985.

12. Secretary of Defense, Program Budget Decision POM 87, October, 1985.

13. U.S. General Accounting Office, Report to the Congress, The Greater Use of Flight Simulators in Military Pilot Training Can Lower Costs and Increase Pilot Proficiency pp. 15-22, Washington, D,C,, General Accounting Office, August 9, 1973.

14. Franklin, Carl L., Marine Corps Flight Simulators How Much Readiness Contribution?, presented to the Institute for Applied Public Financial Management, The American University, 30 November 1982.

15. Center for Naval Analysis professional paper #362, Is the Military Budget Out of Balance?, by Stanley A. Horowitz, September, 1982.

16. Interview with LtCol R.K. Ward, Assistant for Marine Corps programs, Aviation Plans and Requirements Division, 20 August 1985.

17. Lehman, J.F., Secretary of the Navy, "Navy Cuts Deployment Time for Ships to Let Crew Stay at Home More", The Virginian-Pilot and the Ledger-Star, 27 October 1985.

18. Burton, R.N. Management Control of Flight Operations, Masters Thesis, Naval Postgraduate School, Monterey, California, December 1982.

BIBLIOGRAPHY

LITERATURE

Anthony, R.N. and Herzlinger, R.E., Management Control in Non-Profit Organizations, Richard D. Irwin, Inc.,1980.

Burton, R.N. Management Control of Flight Operations, Masters Thesis, Naval Postgraduate School, Monterey, Calif., December 1982.

Center for Naval Analysis professional paper #362, Is the Military Budget Out of Balance?, by S.A. Horowitz, Septtember, 1982.

Center for Naval Analysis report 83-0737, Navy Planning, Programming, Budgeting System: Information for Decision Making: An Assesment of POM-84 and POM-85, by Rosther, B., 17 May 1983.

Center for Naval Analysis report CNR 1, Relating Resources to Readiness, by Horowitz, S.A. and Hibbs, N.J., September 1979.

Department of the Navy, Financial Management Guidebook for Commanding Officers, NAVSO P-3582, April, 1982.

Department of the Navy, Chief of Naval Operations, Strategic Concepts of the U.S. Navy, NWP 1 (Rev A), 1978.

Department of the Navy, Headquarters U.S. Marine Corps, Marine Corps Manual, 1980.

Deparment of the Navy, U.S. Marine Corps, FM 5-1, Marine Aviation, Washington, D.C., 1979.

Education Center, Marine Corps Developement and Education Command, Fleet Marine Force Organization, Quantico, VA, 1981.

Fleet Marine Force, Atlantic Order P7000.2G, Standing Operating Procedures(SOP) for Financial Management, 15 Feb 1983.

Feldman, R.S., and others, Marine Aviation Cost Model, CRC340, Center for Naval Analysis, April, 1978.

Franklin, Carl L., Marine Corps Flight Simulators, How Much Readiness Contribution? paper presented to the Institute for

Applied Public Financial Management, The American University, 30 November 1982.

Ingalls, E.G., Congressional Climate for Naval Aviation, Masters Thesis, Naval Postgraduate School, Monterey, Calif., September, 1979.

Hitch, C.J., and McKean,R.N., The Economics of Defense in the Nuclear Age, Harvard University Press, 1978.

Johnson, W.D., A Study of Budget Formulation in the Fleet Marine Force, Masters Thesis, Naval Postgraduate School, Monterey, Calif., September, 1980.

Maxfield, T., Wallace, J., and Kriegel, D., Aviation Readiness, paper presented at the Naval Postgraduate School, Monterey, Calif., September, 1985.

Navy Personnel Research & Developement Center, Resources and Readiness, A Research and Developement Plan, January, 1982.

Quade, E.S., Analysis for Public Decisions, Elsevier Science Publishing Co., 1984.

U.S. General Accounting Office report GAO/NSIAD-84-39, The Unit Status and Identity Report (UNITREP) System - - What it Does and Does Not Measure, March 12, 1984.

U.S. General Accounting Office report GAO/NSIAD-85-75, Measures of Military Capability: A Discussion of Their Merits, Limitations, and Interrelationships, June 13, 1985.

U.S. General Accounting Office report GAO/NSIAD-86-94, How the DOD Evaluates the Effect of Unit Training, May 1986.

PERSONAL INTERVIEWS

1. W.H. Skierkowski, Deputy Comtroller, FMFPAC; Dayton, OH, 17 May 1985.

2. LtCol R.R. Crawford, Aviation Financial Management Officer, FMFPAC; Camp Smith, HA, 24-25 May 1985.

3. BGen R.A. Gustafson, Deputy Commanding General, FMFPAC; Camp Smith, HA, 25 May 1985.

4. Greg Barber, Aircraft Operations Analyst, NAVCOMPT; Washington, D.C., 19 Aug 1985.

5. LtCol R.K. Ward, Assistant for USMC Aviation Programs, Aquisition and Budget; Lakeridge, VA, 20 Aug 1985.

6. Major J. Pettine, Land Forces Aviation Programer and Flight Hour Program, Aviation Branch, HQMC; Washington, D.C. 20 Aug 1985

7. Col M.J. Lenzini, Executive Assistant, DCS for Aviation, HQMC; Washington, D.C., 20 Aug 1985.

8. J.M. Kiley, Analyst, Flying Hour Program Coordinator; Washington, D.C., 20 Aug 1985.

9. BGen R.N. Moore, Asst DCS for Aviation, HQMC; Monterey, CA, 27 Aug 1985.

10. GySgt M.S. Roeske, Marine Liaison, Flying Hour Program Manager, COMNAVAIRPAC; NAS North Island, CA, 12 Sept 1985.

11. LtCol R.L. Herrington, Plans and Training, 3rd Marine Air Wing; MCAS El Toro, CA, 13 Sept 1985.

12. LtCol C.D. Lea, Comptroller, 3rd Marine Air Wing; MCAS El Toro, 13 Sept 1985.

13. Col D.V. Shuter, Commanding Officer, MAG-16; MCAS(H) Tustin, CA, 14 Sept 1985

14. LtCol R.J. Garner, Asst Operations Officer, MAG-16; MCAS(H) Tustin, CA, 14 Sept 1985.

15. USMC Flying Hour Program Conference, HQMC, Washington, D.C., 28-30 Oct 1985.

16. Col J.M. Chance, Force Comptroller, FMFLANT; Irvine, CA, 28 Jan 1986.

17. Col O.G. Linden, Comptroller, 2nd Marine Air Wing; Irvine, CA, 29 Jan 1986.

18. Maj F.M. Snow, Analyst, Budget Branch and Fiscal FHP Rep, HQMC; Irvine, CA, 29 Jan 1986.

19. Col D.V. Shuter, Commanding Officer, MAG-16; MCAS(H) Tustin, CA, 30 Jan 1986.

20. 1stLt R.C. Martin, MAG-16 Accounting Officer; MCAS(H) Tustin, CA, 30 Jan 1986.

21. Capt P.L. Newman, MAG-16 Aviation Supply Officer; MCAS(H) Tustin, CA, 30 Jan 1986.

22. David Martin, Assistant Regional Manager, United States General Accounting Office, Los Angeles Regional Office; San Diego, CA, May 28, 1986.

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